

T A B L E S, *966*

FOR READILY COMPUTING THE

533. e. 20

L O N G I T U D E, *5*

B Y T H E

L U N A R O B S E R V A T I O N S.

PARTLY NEW, AND PARTLY TAKEN FROM THE REQUISITE
TABLES OF DR. MASKELYNE.

WITH THEIR APPLICATION,
IN A VARIETY OF RULES AND EXAMPLES.

BY WILLIAM CROSWELL, A. M.

TEACHER OF NAVIGATION.



PRINTED AT BOSTON,
BY I. THOMAS AND E. T. ANDREWS,
FAUST'S STATUE, No. 45, Newbury Street.

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EXPLANATION AND USE OF THE TABLES.

TABLE I. Page 1.

THE Logarithmic Numbers in this table are, in conformity to Sherwin's tables, extended to seven places besides the index, but as five places are sufficient for general use, the two right hand figures are separated by a point, so that they may be taken or omitted at pleasure. Whenever the rejected figures exceed 50, an unit must be added to the figure next preceding the point.

The Half Sines and Half Secants are taken out as the common Sines and Secants, and are proportioned to Seconds, either by the rule of three, or by taking parts.

TABLE II. Page 47.

Contains Corrections of the Moon's Altitude for the joint effects of Refraction and Parallax, also certain Logarithms, which are the Differences of the Half Secants of the Moon's True and Apparent Altitudes lessened by 600, which number is uniformly the difference between the Half Secants of the True and Apparent Altitudes of a fixed Star, or any other Celestial Object that is not sensibly affected by Parallax, at Altitudes above 25 degrees. These numbers are the half complements of the Logarithms in table IX, of the Requisite Tables. Find the Moon's Apparent Altitude at the top of the table, and her Horizontal Parallax in either of the side columns, then, below the former, and opposite to the latter, under Corr. will stand the Correction which must be added to the Moon's Apparent Altitude to obtain her True Altitude, and under Log. stands the Corresponding Logarithm.

TABLE III. Page 69.

Find the Sun's Apparent Altitude in Degrees under D. against it under N. is a Number which must be added to the Logarithm taken from table II.

TABLE

T A B L E IV. *Page 69*

Find the Star's Apparent Altitude in degrees under D. against it, under N. is a Number which must be added to the Logarithm from table II.

T A B L E V. *Page 71.*

Look for the Degree, or Hour, and the Minutes to either, at the top of the page, and for the Seconds in either of the side columns; under the former and opposite to the latter, stands the Logarithm sought.

T A B L E VI. *Page 90.*

Find the Apparent Altitude in Degrees and Minutes under D. M. against it is the corresponding effect of Refraction in Minutes and Seconds, which must be subtracted from the Apparent Altitude of the Heavenly Bodies.

T A B L E VII. *Page 90.*

Find the height of the eye in feet, against it is the allowance in Minutes and Seconds that is to be made for the Dip of the Horizon, which must be subtracted from the Observed Altitude.

T A B L E VIII. *Page 90.*

Find the Sun's Apparent Altitude under D. against it is the Correction for the Sun's Parallax.

T A B L E IX. *Page 90.*

Find the Moon's Altitude under D. against it is the corresponding Augmentation of her semidiameter.

T A B L E X. *Page 90.*

Is of use when the Sun is over the land at the time when it is wanted, and the shore nearer to the ship than the visible horizon would be if it was unconfined. Enter the top column with the height of the eye above the surface of the sea, in feet, and the left hand side column, with the distance of the ship from the land in sea miles; then, directly under the former and opposite the latter, will stand the Dip of that point in minutes of a degree, which must be subtracted from the Observed Altitude instead of the numbers in table VII.

T A B L E XI. *Page 91.*

Contains the Right Ascensions in Time, and the Declinations of sixty of the principal fixed Stars, with their Annual Variations, both in Right Ascension and Declination, in seconds and decimal parts. If the Places of these Stars are wanted for any time after the beginning of the year 1780, multiply the Annual Variation both in Right Ascension and Declination by the number of years that have elapsed since that time;

to

to the product add such part of the Annual Variation as is passed of the current year, and the sum will be the Variation from the beginning of 1780 to the given time. This Variation must always be added to the Right Ascension for 1780; but the Variation in Declination must be added or subtracted, accordingly as the sign $+$ or $-$ is found against the Annual Variation in the last column of the table, to give the Right Ascension and Declination for the succeeding years: But if the places of the Stars be wanted for any time before the beginning of the year 1780, the Variation in Right Ascension must be subtracted from the Right Ascension found in the table, and the Variation in Declination must be applied with a contrary sign to that which is set against it.

T A B L E XII. Page 92.

This table is to be entered in the top column, with the Daily Variation of the Moon's passing the Meridian, and in the left hand side column, with the Longitude of the ship or place; directly under the former and opposite to the latter, stands a number of minutes, which, being added to the time of the Moon's passing the Meridian of Greenwich, if the Longitude be west; or subtracted from it if the Longitude be east, will give the time of its passage over the Meridian of the given place.

Note. The Daily Variation of the Moon's passing the Meridian is found by taking the difference between the time of the Moon's passage over the Meridian of Greenwich on the proposed day and the day following, if the Longitude of the ship or place be west; or between the time of her passage on the proposed day and that preceding it, if the ship or place be in east Longitude.

T A B L E XIII. Page 93.

Find the Degree, or Minutes of a Degree under $^{\circ}$, against them will stand the corresponding parts of time in hours and minutes, or minutes and seconds, and *vice versa*.

T A B L E XIV. Page 94.

The directions given at the top of this table, and in the 7th Rule of Section VI, sufficiently explain its use.

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THE Half Sines and Half Secants in table I, and the Logarithms in Table II, were calculated for this collection. By applying them to Mr. *Dunthorne's* Rule in the Practical Navigator, the Moon's true distance from the Sun, or a Star is obtained by a more simple operation. The second method, in Section IV, is still shorter, but requires a Table of Sines and Tangents which are here omitted, because they are contained in the Practical Navigator, with which and the Nautical Almanack these Tables are designed to be used. Some of the rules in the Application of the Tables are new, others, with most of the examples, are taken from the Requisite Tables, the Practical Navigator, and Robertson's Elements. Some improvements have also been made in the disposition of the Tables. The corrections and Logarithms are set together in Table II, that, as they depend on the same arguments, they may be taken out at the same time. To facilitate the use of this Table still farther, the Moon's Altitude is set both at the top and bottom of the page, and her Horizontal Parallax both in the right and left hand side columns. Table XIV, and Section VI, are added to accommodate those who prefer Mr. Lyons's method. The first Section is inserted chiefly on account of its use in computing the Azimuth, and the Distance of two places from their Longitudes and Latitudes, or of two Stars from their Longitudes and Latitudes or Right Ascensions and Declinations.

TABLE I.

SECANTS, HALF SECANTS,

AND

HALF SINES.

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0 Degree.

M	Seconds	Colours	Half Sines	Half Colours	Half Sec.	Half Col.	M
0	0.00000,00	Infinite.	0.00000,00	Infinite.	0.00000,00	0.00000,00	90
1	0.00000,00	3.53527,39	3.53527,39	1.75813,70	0.00000,00	0.00000,00	59
2	0.01	3.53527,39	3.53527,39	6.1769,19	0.01	4.99999,99	58
3	0.02	3.53527,39	3.53527,39	5.952,53	0.02	9.99	57
4	0.03	3.53527,39	3.53527,39	46710,70	0.03	9.98	56
5	0.04	3.53527,39	3.53527,39	4186,30	0.04	9.97	55
6	0.05	3.53527,39	3.53527,39	37906,14	0.05	9.96	54
7	0.06	3.53527,39	3.53527,39	34558,80	0.06	9.95	53
8	0.07	3.53527,39	3.53527,39	31659,31	0.07	9.94	52
9	0.08	3.53527,39	3.53527,39	29101,59	0.08	9.93	51
10	0.09	3.53527,39	3.53527,39	26813,73	0.09	9.91	50
11	0.10	3.53527,39	3.53527,39	24744,09	0.10	9.99999,99	49
12	0.11	3.53527,39	3.53527,39	22854,67	0.11	9.87	48
13	0.12	3.53527,39	3.53527,39	21165,58	0.12	9.84	47
14	0.13	3.53527,39	3.53527,39	19517,34	0.13	9.82	46
15	0.14	3.53527,39	3.53527,39	18009,30	0.14	9.79	45
16	0.15	3.53527,39	3.53527,39	16607,77	0.15	9.76	44
17	0.16	3.53527,39	3.53527,39	15291,33	0.16	9.73	43
18	0.17	3.53527,39	3.53527,39	14050,17	0.17	9.70	42
19	0.18	3.53527,39	3.53527,39	12876,13	0.18	9.67	41
20	0.19	3.53527,39	3.53527,39	11762,31	0.19	9.63	40
21	0.20	3.53527,39	3.53527,39	10702,86	0.20	9.99999,99	39
22	0.21	3.53527,39	3.53527,39	9692,71	0.21	9.55	38
23	0.22	3.53527,39	3.53527,39	8727,46	0.22	9.51	37
24	0.23	3.53527,39	3.53527,39	7809,31	0.23	9.47	36
25	0.24	3.53527,39	3.53527,39	6916,88	0.24	9.43	35
26	0.25	3.53527,39	3.53527,39	6066,33	0.25	9.38	34
27	0.26	3.53527,39	3.53527,39	5245,73	0.26	9.33	33
28	0.27	3.53527,39	3.53527,39	4456,04	0.27	9.28	32
29	0.28	3.53527,39	3.53527,39	3694,05	0.28	9.23	31
30	0.29	3.53527,39	3.53527,39	2957,91	0.29	9.17	30
31	0.30	3.53527,39	3.53527,39	2246,91	0.30	9.99999,99	29
32	0.31	3.53527,39	3.53527,39	1556,51	0.31	9.06	28
33	0.32	3.53527,39	3.53527,39	988,33	0.32	9.00	27
34	0.33	3.53527,39	3.53527,39	429,10	0.33	8.94	26
35	0.34	3.53527,39	3.53527,39	99,67	0.34	8.87	25
36	0.35	3.53527,39	3.53527,39	1,03	0.35	8.81	24
37	0.36	3.53527,39	3.53527,39	0.998,97	0.36	8.74	23
38	0.37	3.53527,39	3.53527,39	984,03	0.37	8.67	22
39	0.38	3.53527,39	3.53527,39	978,24	0.38	8.60	21
40	0.39	3.53527,39	3.53527,39	971,19	0.39	8.53	20
41	0.40	3.53527,39	3.53527,39	961,75	0.40	9.99999,99	19
42	0.41	3.53527,39	3.53527,39	951,77	0.41	8.38	18
43	0.42	3.53527,39	3.53527,39	941,40	0.42	8.30	17
44	0.43	3.53527,39	3.53527,39	930,65	0.43	8.22	16
45	0.44	3.53527,39	3.53527,39	919,53	0.44	8.14	15
46	0.45	3.53527,39	3.53527,39	907,96	0.45	8.05	14
47	0.46	3.53527,39	3.53527,39	895,94	0.46	7.97	13
48	0.47	3.53527,39	3.53527,39	883,47	0.47	7.88	12
49	0.48	3.53527,39	3.53527,39	870,53	0.48	7.79	11
50	0.49	3.53527,39	3.53527,39	857,14	0.49	7.70	10
51	0.50	3.53527,39	3.53527,39	843,30	0.50	9.99999,99	9
52	0.51	3.53527,39	3.53527,39	829,01	0.51	7.51	8
53	0.52	3.53527,39	3.53527,39	814,26	0.52	7.42	7
54	0.53	3.53527,39	3.53527,39	799,05	0.53	7.32	6
55	0.54	3.53527,39	3.53527,39	783,38	0.54	7.23	5
56	0.55	3.53527,39	3.53527,39	767,14	0.55	7.13	4
57	0.56	3.53527,39	3.53527,39	750,41	0.56	7.01	3
58	0.57	3.53527,39	3.53527,39	733,16	0.57	6.91	2
59	0.58	3.53527,39	3.53527,39	715,39	0.58	6.80	1
60	0.59	3.53527,39	3.53527,39	697,09	0.59	6.69	0
M	Colours	Secants	Half Col.	Half Sec.	Half Col.	Half Sines	M

A

89 Degrees.

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.00006,84	75814,47	4.12092,76	0.87907,22	0.00003,31	4.99996,69	50
1	0.00006,84	75806,68	4.12451,66	0.87842,34	0.00003,42	4.99996,58	49
2	7,06	74390,57	12804,71	87196,49	03,53	96,47	48
3	7,29	73695,76	13162,12	86847,88	03,64	96,36	47
4	7,53	73011,90	13494,05	86505,95	03,76	96,23	46
5	7,76	72338,64	13800,68	86169,32	03,88	96,12	45
6	8,00	71676,66	14162,17	85837,83	04,00	96,00	44
7	8,25	71022,66	14488,67	85511,33	04,13	95,87	43
8	8,50	70379,33	14810,83	85189,67	04,25	95,75	42
9	8,75	69745,40	15127,30	84872,70	04,38	95,62	41
10	9,00	69120,59	15439,70	84560,29	04,50	95,50	40
11	0.00009,26	1.68504,64	4.15747,68	0.84252,32	0.00004,63	4.99995,37	39
12	09,53	67897,31	16051,34	83948,66	04,77	95,23	38
13	09,79	67298,37	16356,81	83659,19	04,89	95,10	37
14	10,06	66707,57	16646,21	83383,79	05,03	94,97	36
15	10,34	66124,71	16937,64	83106,35	05,17	94,83	35
16	10,61	65549,57	17225,11	82827,78	05,30	94,69	34
17	10,89	64981,95	17509,02	82549,08	05,45	94,55	33
18	11,18	64421,05	17789,17	82271,82	05,59	94,41	32
19	11,47	63868,50	18065,75	81994,75	05,74	94,26	31
20	11,76	63322,31	18338,84	81661,15	05,88	94,12	30
21	0.00012,06	1.62782,90	4.18608,55	0.81391,45	0.00006,03	4.99993,97	29
22	12,36	62250,12	18874,94	81125,06	06,18	93,82	28
23	12,66	61723,80	19138,10	80861,90	06,33	93,67	27
24	12,97	61203,78	19398,11	80601,89	06,49	93,51	26
25	13,28	60689,92	19655,04	80344,96	06,64	93,36	25
26	13,59	60182,07	19908,96	80091,03	06,79	93,20	24
27	13,91	59680,10	20159,95	79840,05	06,96	93,04	23
28	14,23	59183,86	20408,07	79591,93	07,12	92,88	22
29	14,56	58693,24	20653,38	79346,62	07,28	92,72	21
30	14,88	58208,10	20895,95	79104,05	07,44	92,56	20
31	0.00015,22	1.57728,32	4.21135,84	0.78864,16	0.00007,61	4.99991,39	19
32	15,55	57253,79	21373,10	78626,89	07,77	92,32	18
33	15,89	56784,39	21607,80	78394,19	07,95	92,05	17
34	16,24	56320,01	21839,99	78160,01	08,12	91,88	16
35	16,58	55860,56	22069,72	77930,28	08,29	91,71	15
36	16,94	55405,91	22297,04	77702,95	08,47	91,53	14
37	17,29	54955,98	22522,01	77477,99	08,65	91,35	13
38	17,65	54510,66	22744,67	77255,33	08,82	91,17	12
39	18,01	54069,87	22965,06	77034,93	09,01	90,99	11
40	18,38	53633,51	23183,29	76816,71	09,19	90,81	10
41	0.00018,75	1.53201,50	4.23399,25	0.76600,75	0.00009,38	4.99990,62	9
42	19,12	53273,74	23613,13	76386,87	09,56	90,44	18
43	19,50	52850,16	23824,92	76175,08	09,75	90,25	17
44	19,88	52430,68	24034,66	75965,34	09,94	90,06	16
45	20,26	51515,21	24242,39	75757,61	10,13	89,87	15
46	20,65	51103,68	24448,16	75551,84	10,33	89,67	14
47	21,04	50696,02	24651,99	75348,01	10,52	89,48	13
48	21,44	50292,16	24853,92	75146,08	10,72	89,28	12
49	21,83	49892,02	25053,99	74946,01	10,92	89,08	11
50	22,24	49495,53	25252,23	74747,76	11,12	88,88	10
51	0.00022,64	1.49102,64	4.25448,68	0.74531,32	0.00011,32	4.99988,68	9
52	23,05	48713,27	25643,36	74356,63	11,53	88,47	8
53	23,47	48327,36	25836,32	74183,68	11,74	88,26	7
54	23,88	47944,86	26027,57	73972,43	11,94	88,06	6
55	24,30	47565,70	26217,15	73782,85	12,15	87,85	5
56	24,73	47189,83	26405,08	73594,92	12,37	87,63	4
57	25,16	46817,19	26591,40	73408,59	12,58	87,42	3
58	25,59	46447,72	26776,14	73223,86	12,79	87,20	2
59	26,02	46081,37	26959,31	73040,69	13,01	86,99	1
60	26,46	45718,08	27140,96	72859,04	13,23	86,77	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines	M

3. Dagegen

[illegible]

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.00012,92	1.15641,55	4.12179,22	0.57820,78	0.00052,36	4.99947,04	60
1	0.00128,31	1.15641,55	4.12179,22	0.57730,63	0.00053,41	4.99946,59	59
2	0.00256,70	1.15281,78	4.12339,18	0.57640,87	0.00053,85	4.99946,15	58
3	0.00385,09	1.14921,98	4.12498,58	0.57551,47	0.00054,30	4.99945,70	57
4	0.00513,48	1.14561,88	4.12657,55	0.57462,44	0.00054,74	4.99945,26	56
5	0.00641,87	1.14201,55	4.12816,22	0.57373,78	0.00055,19	4.99944,81	55
6	0.00770,26	1.13841,97	4.12974,52	0.57285,42	0.00055,65	4.99944,35	54
7	0.00898,65	1.13482,07	4.13132,46	0.57197,54	0.00056,10	4.99943,90	53
8	0.01027,04	1.13121,99	4.13290,05	0.57109,95	0.00056,56	4.99943,44	52
9	0.01155,43	1.12761,43	4.13447,28	0.57022,72	0.00057,01	4.99942,99	51
10	0.01283,82	1.12401,67	4.13604,16	0.56935,84	0.00057,47	4.99942,53	50
11	0.01412,21	1.12041,61	4.13761,59	0.56849,31	0.00057,93	4.99942,07	49
12	0.01540,60	1.11681,24	4.13918,88	0.56763,12	0.00058,40	4.99941,60	48
13	0.01669,00	1.11321,55	4.14075,72	0.56677,28	0.00058,86	4.99941,14	47
14	0.01797,39	1.10961,54	4.14232,23	0.56591,77	0.00059,33	4.99940,68	46
15	0.01925,78	1.10601,20	4.14389,40	0.56506,60	0.00059,80	4.99940,20	45
16	0.02054,17	1.10241,54	4.14546,23	0.56421,77	0.00060,27	4.99939,73	44
17	0.02182,56	1.10001,64	4.14703,73	0.56337,27	0.00060,74	4.99939,26	43
18	0.02310,95	1.10001,64	4.14860,90	0.56253,10	0.00061,21	4.99938,79	42
19	0.02439,34	1.10001,64	4.15017,75	0.56169,25	0.00061,69	4.99938,31	41
20	0.02567,73	1.10001,64	4.15174,27	0.56085,73	0.00062,17	4.99937,84	40
21	0.02696,12	1.10001,64	4.15331,46	0.56002,52	0.00062,65	4.99937,37	39
22	0.02824,51	1.10001,64	4.15488,34	0.55919,66	0.00063,13	4.99936,90	38
23	0.02952,90	1.10001,64	4.15645,90	0.55837,10	0.00063,61	4.99936,43	37
24	0.03081,29	1.10001,64	4.15803,15	0.55754,85	0.00064,10	4.99935,96	36
25	0.03209,68	1.10001,64	4.15960,09	0.55672,91	0.00064,58	4.99935,49	35
26	0.03338,07	1.10001,64	4.16117,71	0.55591,29	0.00065,07	4.99935,02	34
27	0.03466,46	1.10001,64	4.16275,93	0.55509,97	0.00065,56	4.99934,55	33
28	0.03594,85	1.10001,64	4.16433,04	0.55428,96	0.00066,05	4.99934,08	32
29	0.03723,24	1.10001,64	4.16591,75	0.55348,25	0.00066,55	4.99933,61	31
30	0.03851,63	1.10001,64	4.16749,16	0.55267,84	0.00067,05	4.99933,14	30
31	0.03980,02	1.10001,64	4.16907,27	0.55187,73	0.00067,54	4.99932,67	29
32	0.04108,41	1.10001,64	4.17065,09	0.55107,91	0.00068,04	4.99932,20	28
33	0.04236,80	1.10001,64	4.17223,61	0.55028,39	0.00068,54	4.99931,73	27
34	0.04365,19	1.10001,64	4.17381,84	0.54949,16	0.00069,05	4.99931,26	26
35	0.04493,58	1.10001,64	4.17539,77	0.54870,23	0.00069,55	4.99930,79	25
36	0.04621,97	1.10001,64	4.17697,42	0.54791,58	0.00070,06	4.99930,32	24
37	0.04750,36	1.10001,64	4.17855,74	0.54713,21	0.00070,57	4.99929,85	23
38	0.04878,75	1.10001,64	4.18013,87	0.54635,23	0.00071,08	4.99929,38	22
39	0.05007,14	1.10001,64	4.18171,67	0.54557,33	0.00071,59	4.99928,91	21
40	0.05135,53	1.10001,64	4.18329,19	0.54479,81	0.00072,11	4.99928,44	20
41	0.05263,92	1.10001,64	4.18487,43	0.54402,87	0.00072,62	4.99927,97	19
42	0.05392,31	1.10001,64	4.18645,40	0.54325,60	0.00073,14	4.99927,50	18
43	0.05520,70	1.10001,64	4.18803,09	0.54248,91	0.00073,66	4.99927,03	17
44	0.05649,09	1.10001,64	4.18961,52	0.54172,48	0.00074,19	4.99926,56	16
45	0.05777,48	1.10001,64	4.19119,67	0.54096,33	0.00074,71	4.99926,09	15
46	0.05905,87	1.10001,64	4.19277,90	0.54020,50	0.00075,24	4.99925,62	14
47	0.06034,26	1.10001,64	4.19435,97	0.53944,83	0.00075,76	4.99925,15	13
48	0.06162,65	1.10001,64	4.19593,52	0.53869,28	0.00076,29	4.99924,68	12
49	0.06291,04	1.10001,64	4.19751,61	0.53793,39	0.00076,82	4.99924,21	11
50	0.06419,43	1.10001,64	4.19909,44	0.53717,56	0.00077,35	4.99923,74	10
51	0.06547,82	1.10001,64	4.20067,97	0.53641,99	0.00077,88	4.99923,27	9
52	0.06676,21	1.10001,64	4.20225,33	0.53566,67	0.00078,41	4.99922,80	8
53	0.06804,60	1.10001,64	4.20383,39	0.53491,61	0.00078,94	4.99922,33	7
54	0.06933,00	1.10001,64	4.20541,29	0.53416,81	0.00079,47	4.99921,86	6
55	0.07061,39	1.10001,64	4.20699,73	0.53342,25	0.00080,00	4.99921,39	5
56	0.07189,78	1.10001,64	4.20857,40	0.53267,95	0.00080,53	4.99920,92	4
57	0.07318,17	1.10001,64	4.21015,11	0.53193,89	0.00081,06	4.99920,45	3
58	0.07446,56	1.10001,64	4.21172,91	0.53119,09	0.00081,59	4.99920,00	2
59	0.07574,95	1.10001,64	4.21330,48	0.53044,52	0.00082,12	4.99919,53	1
60	0.07703,34	1.10001,64	4.21488,80	0.52970,20	0.00082,65	4.99919,06	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

M	Secants.	Cosecants.	Half Sines.	Half Cosec.	Half Sec.	Half Cot.	M
0	0.00166,68	1.05970,40	4.47014,80	0.52985,30	0.00084,79	4.99917,21	60
1	0.00166,68	1.05826,24	4.47086,88	0.52913,12	0.00083,34	4.99916,66	59
2	167,80	5682,57	47158,71	52841,29	83,90	16,10	58
3	163,91	5539,37	47230,31	52769,69	84,46	15,54	57
4	170,03	5396,65	47301,67	52698,33	85,02	14,98	56
5	171,15	5264,39	47372,80	52627,20	85,68	14,42	55
6	172,28	5112,61	47443,69	52556,31	86,14	13,86	54
7	173,40	4971,20	47514,35	52485,65	86,70	13,30	53
8	174,54	4830,42	47584,78	52415,22	87,27	12,73	52
9	175,67	4690,04	47654,98	52345,02	87,84	12,16	51
10	176,81	4550,09	47724,95	52275,05	88,41	11,59	50
11	0.00177,96	1.04410,60	4.47794,70	0.52205,30	0.00088,98	4.99911,02	49
12	179,11	4271,57	47864,21	52135,79	89,56	10,44	48
13	180,26	4132,97	47933,51	52066,49	90,13	9,87	47
14	181,41	3994,83	48002,68	51997,42	90,71	9,29	46
15	182,57	3857,12	48071,44	51928,66	91,29	8,71	45
16	183,74	3719,86	48140,07	51859,93	91,87	8,13	44
17	184,90	3583,03	48208,48	51791,52	92,45	7,55	43
18	186,09	3446,63	48276,68	51723,32	93,04	6,96	42
19	187,25	3310,66	48344,67	51655,33	93,63	6,37	41
20	188,42	3175,13	48412,43	51587,57	94,21	5,79	40
21	0.00189,60	1.03040,01	4.48479,99	0.51520,01	0.00094,80	4.99906,20	39
22	190,79	2905,32	48487,34	51452,66	95,40	5,20	38
23	191,98	2771,05	48554,47	51385,53	95,99	4,61	37
24	193,17	2637,20	48621,40	51318,60	96,59	4,01	36
25	194,37	2503,76	48688,12	51251,88	97,19	3,41	35
26	195,57	2370,74	48754,63	51185,37	97,79	2,81	34
27	196,77	2238,12	48820,94	51119,06	98,39	2,21	33
28	197,98	2105,92	48887,04	51052,96	98,99	1,61	32
29	199,19	1974,11	48952,94	50987,06	99,60	1,01	31
30	200,40	1842,71	49018,64	50921,36	00,20	0,40	30
31	0.00201,62	1.01711,71	4.49144,14	0.50855,86	0.00100,81	4.99899,19	29
32	202,84	1708,11	49089,44	50790,56	101,42	0,80	28
33	204,07	1560,90	49144,55	50725,45	102,04	0,19	27
34	205,30	1421,09	49199,45	50660,55	102,65	0,58	26
35	206,53	1291,56	49244,17	50595,83	103,27	0,96	25
36	207,77	1162,63	49288,68	50531,32	103,89	1,35	24
37	209,01	1033,92	49333,01	50466,99	104,51	1,74	23
38	210,25	905,71	49377,14	50402,86	105,13	2,13	22
39	211,50	777,83	49421,08	50338,92	105,75	2,52	21
40	212,75	650,32	49464,84	50274,16	106,38	2,91	20
41	0.00214,11	1.00423,19	4.49788,40	0.50211,60	0.00107,01	4.99892,99	19
42	215,27	526,45	49511,78	50148,22	107,64	3,30	18
43	216,53	407,06	49549,97	50085,03	108,27	3,69	17
44	217,80	287,05	49587,97	50022,03	108,90	4,08	16
45	219,01	167,18	49625,80	49959,20	109,54	4,47	15
46	220,34	97,93	49663,43	49896,57	110,17	4,86	14
47	221,62	68,21	49699,89	49834,11	110,81	5,25	13
48	222,90	38,66	49736,17	49771,83	111,45	5,64	12
49	224,18	9,47	49772,26	49709,74	112,09	6,03	11
50	225,47	9,54	49808,18	49647,82	112,74	6,42	10
51	0.00226,77	0.99172,16	4.50413,92	0.49586,08	0.00113,89	4.99886,61	9
52	228,06	904,04	50475,48	49524,52	114,03	6,81	8
53	229,26	802,26	50530,87	49463,13	114,68	7,20	7
54	230,67	699,84	50589,08	49401,92	115,34	7,59	6
55	231,97	596,77	50649,11	49340,89	115,99	7,98	5
56	233,28	493,04	50709,98	49280,02	116,64	8,37	4
57	234,60	388,65	50780,67	49219,33	117,30	8,76	3
58	235,92	283,71	50841,19	49158,81	117,96	9,15	2
59	237,04	179,01	50901,54	49098,46	118,62	9,54	1
60	238,57	80,65	50961,73	49038,27	119,29	9,93	0
Cosecants.		Secants.	Half Cot.	Half Sec.	Half Cosec.	Half Sines.	M

6 Degrees.

M	Secants.	Cosecants.	Half Sines.	Half Cosec.	Half Sec.	Half Tan.	M
0	0.0038,57	0.98076,64	4.50661,73	0.49038,27	0.00119,29	4.99880,71	60
1	0.0038,89	0.97956,64	4.51041,74	0.48978,26	0.00119,95	4.99880,05	59
2	341,23	7836,82	51081,59	48918,41	120,62	879,38	58
3	392,57	2717,46	51141,27	48858,73	121,29	878,71	57
4	443,91	2497,43	51200,78	48799,22	121,96	878,04	56
5	445,25	2479,78	51260,18	48739,87	122,63	877,37	55
6	446,60	2361,35	51319,32	48680,68	123,30	876,70	54
7	447,95	2243,31	51378,34	48621,66	123,98	876,02	53
8	449,31	2125,68	51437,21	48562,79	124,66	875,34	52
9	450,67	2008,28	51495,91	48504,09	125,34	874,66	51
10	452,03	6891,10	51554,45	48445,55	126,02	873,98	50
11	0.0039,10	0.97774,33	4.51612,84	0.48387,16	0.00126,70	4.99873,30	49
12	354,77	6657,88	51671,06	48328,94	127,38	873,31	48
13	356,12	6541,75	51729,12	48270,88	128,07	872,63	47
14	357,46	6425,93	51787,03	48212,97	128,76	871,94	46
15	358,90	6310,42	51844,79	48155,21	129,45	871,25	45
16	360,29	6195,23	51902,38	48097,62	130,14	870,56	44
17	361,67	6080,34	51959,83	48040,17	130,84	869,87	43
18	363,07	5965,76	52017,12	47982,88	131,53	869,18	42
19	364,46	5851,48	52074,26	47925,74	132,23	868,49	41
20	365,86	5737,51	52131,24	47868,76	132,93	867,80	40
21	0.0039,27	0.97623,83	4.51888,08	0.47811,92	0.00133,63	4.99866,36	39
22	368,68	5620,46	52244,77	47755,23	133,64	867,11	38
23	370,09	5507,39	52301,30	47698,70	134,35	866,42	37
24	371,50	5394,62	52357,69	47642,31	135,06	865,73	36
25	372,92	5282,14	52413,93	47586,07	135,77	865,04	35
26	374,34	5169,95	52470,02	47529,98	136,48	864,35	34
27	375,77	5058,06	52525,97	47474,03	137,19	863,66	33
28	377,20	4946,46	52581,77	47418,23	137,90	862,97	32
29	378,63	4835,15	52637,42	47362,58	138,61	862,28	31
30	380,07	4724,12	52692,94	47307,06	139,32	861,59	30
31	0.0039,41	0.97453,39	4.52748,30	0.47251,70	0.00140,75	4.99859,44	29
32	382,96	4612,94	52800,53	47196,47	140,03	860,90	28
33	384,41	4502,77	52856,61	47141,39	140,74	860,21	27
34	385,86	4392,80	52912,55	47086,45	141,45	859,52	26
35	387,32	4283,28	52968,36	47031,64	142,16	858,83	25
36	388,78	4174,96	53023,94	46976,98	142,87	858,14	24
37	390,24	4066,91	53077,54	46922,46	143,58	857,45	23
38	391,71	3959,14	53131,93	46868,07	144,29	856,76	22
39	393,18	3851,65	53186,17	46813,83	145,00	856,07	21
40	394,65	3744,43	53240,28	46759,72	145,71	855,38	20
41	0.0039,56	0.97211,48	4.53294,26	0.46705,74	0.00148,07	4.99851,93	19
42	397,61	3636,81	53348,09	46651,41	146,42	854,69	18
43	399,10	3529,40	53401,80	46598,20	147,13	854,00	17
44	400,59	3422,26	53455,37	46544,63	147,84	853,31	16
45	402,08	3315,39	53508,80	46491,20	148,55	852,62	15
46	403,58	3208,79	53562,10	46437,99	149,26	851,93	14
47	405,08	3102,45	53615,27	46384,73	150,00	851,24	13
48	406,58	2996,37	53668,31	46331,69	150,71	850,55	12
49	408,09	2890,56	53721,22	46278,78	151,42	849,86	11
50	409,60	2784,01	53773,99	46226,01	152,13	849,17	10
51	0.0039,71	0.96934,71	4.53826,64	0.46173,30	0.00155,56	4.99844,44	9
52	412,64	2678,68	53829,16	46119,84	152,84	848,48	8
53	414,16	2573,90	53881,55	46066,45	153,55	847,79	7
54	415,66	2469,38	53933,81	46013,19	154,26	847,10	6
55	417,22	2365,11	53985,94	45960,06	154,97	846,41	5
56	418,75	2261,10	54037,95	45907,05	155,68	845,72	4
57	420,29	2157,34	54089,83	45854,17	156,39	845,03	3
58	421,83	2053,83	54141,58	45801,42	157,10	844,34	2
59	423,38	1950,57	54193,21	45748,79	157,81	843,65	1
60	424,92	1847,55	54244,72	45696,28	158,52	842,96	0
M	Cosecants.	Secants.	Half Tan.	Half Sec.	Half Cosec.	Half Sines.	M

83 Degrees.

7 Degrees.

M.	Secants.	Cofecants.	Half Sine.	Half Cofec.	Half Sec.	Half Cof.	M.
0	0.00344.98	0.91410.55	0.54294.72	0.45705.28	0.00162.47	4.99837.53	90
1	0.00346.48	0.91307.79	4.5434.10	4.5565.90	0.00163.24	4.99837.76	89
2	328.04	91205.27	54387.38	45602.62	164.02	835.98	58
3	329.60	91103.00	54448.50	45551.50	164.86	835.20	57
4	331.16	91000.97	54499.51	45500.48	165.58	834.42	56
5	332.73	90899.18	54550.41	45449.59	166.37	833.63	55
6	334.30	90797.63	54601.18	45398.82	167.15	832.85	54
7	335.88	90696.33	54651.83	45348.17	167.94	832.06	53
8	337.46	90595.26	54702.37	45297.63	168.73	831.27	52
9	339.04	90494.44	54752.78	45247.22	169.52	830.48	51
10	340.62	90393.85	54803.07	45196.93	170.31	829.68	50
11	0.00348.21	0.90293.49	4.54853.25	4.5146.75	0.00171.11	4.99828.89	49
12	343.81	90193.38	54903.31	45096.69	171.91	828.09	48
13	345.41	90093.49	54953.25	45046.74	172.71	827.29	47
14	347.01	89993.84	55003.08	44996.92	173.50	826.49	46
15	348.61	89894.42	55052.79	44947.21	174.31	825.69	45
16	350.23	89795.23	55102.38	44897.62	175.12	824.88	44
17	351.84	89696.27	55151.86	44848.14	175.92	824.08	43
18	353.45	89597.54	55201.23	44798.77	176.72	823.27	42
19	355.07	89499.04	55250.48	44749.52	177.54	822.46	41
20	356.70	89400.76	55299.62	44700.38	178.35	821.65	40
21	0.00358.33	0.89301.71	4.55348.64	4.4651.35	0.00179.17	4.99820.83	39
22	359.96	89204.88	55397.56	44602.44	179.98	820.83	38
23	361.59	89107.28	55446.36	44553.64	180.79	819.92	37
24	363.23	89009.90	55495.05	44504.95	181.62	818.98	36
25	364.87	88912.74	55543.63	44456.37	182.43	817.95	35
26	366.52	88815.80	55592.10	44407.90	183.26	816.74	34
27	368.17	88719.08	55640.46	44359.54	184.09	815.91	33
28	369.82	88622.58	55688.71	44311.29	184.91	815.09	32
29	371.48	88526.30	55736.84	44263.13	185.74	814.26	31
30	373.14	88430.23	55784.89	44215.11	186.57	813.43	30
31	0.00374.81	0.88334.38	4.55832.81	4.41167.19	0.00187.11	4.99812.89	29
32	376.48	88238.75	55880.62	44119.38	187.24	811.76	28
33	378.15	88143.33	55928.33	44071.66	188.08	810.92	27
34	379.83	88048.12	55975.94	44024.06	188.92	810.08	26
35	381.51	87953.12	56023.44	43976.56	189.75	809.24	25
36	383.19	87858.33	56070.83	43929.17	190.59	808.40	24
37	384.88	87763.76	56118.12	43881.88	191.44	807.56	23
38	386.57	87669.39	56165.30	43834.69	192.28	806.71	22
39	388.26	87575.23	56212.38	43787.62	193.13	805.87	21
40	389.96	87481.28	56259.36	43740.64	194.08	805.02	20
41	0.00391.66	0.87387.54	4.56306.23	4.3693.77	0.00195.83	4.99804.17	19
42	393.37	87294.00	56353.00	43647.00	196.69	803.31	18
43	395.08	87200.66	56399.67	43600.33	197.54	802.46	17
44	396.74	87107.53	56446.23	43553.76	198.39	801.60	16
45	398.51	87014.63	56492.69	43507.31	199.26	800.74	15
46	400.23	86921.88	56539.06	43460.94	200.12	799.88	14
47	401.96	86829.36	56585.32	43414.68	200.98	799.02	13
48	403.69	86737.03	56631.48	43368.52	201.84	798.15	12
49	405.42	86644.91	56677.54	43322.46	202.71	797.29	11
50	407.16	86552.98	56723.51	43276.49	203.58	796.42	10
51	0.00408.89	0.86461.25	4.56769.37	4.3230.63	0.00204.45	4.99795.55	9
52	410.64	86366.72	56815.14	43184.86	205.32	794.68	8
53	412.39	86272.39	56860.80	43139.20	206.19	793.80	7
54	414.14	86178.25	56906.37	43093.62	207.07	792.93	6
55	415.89	86086.30	56951.85	43048.15	207.95	792.05	5
56	417.65	86000.55	56997.22	43002.78	208.83	791.17	4
57	419.41	85914.19	57042.50	42957.49	209.71	790.29	3
58	421.18	85828.63	57087.68	42912.32	210.59	789.41	2
59	422.95	85734.45	57132.77	42867.42	211.48	788.52	1
60	424.72	85644.47	57177.76	42822.24	212.36	787.64	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sine.	M

82 Degrees.

9

	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Sines.
0	0.0000000	1.0000000	0.0000000	1.0000000	0.0000000	1.0000000
1	0.0000000	0.9999999	0.0000000	0.9999999	0.0000000	0.9999999
2	0.0000000	0.9999998	0.0000000	0.9999998	0.0000000	0.9999998
3	0.0000000	0.9999997	0.0000000	0.9999997	0.0000000	0.9999997
4	0.0000000	0.9999996	0.0000000	0.9999996	0.0000000	0.9999996
5	0.0000000	0.9999995	0.0000000	0.9999995	0.0000000	0.9999995
6	0.0000000	0.9999994	0.0000000	0.9999994	0.0000000	0.9999994
7	0.0000000	0.9999993	0.0000000	0.9999993	0.0000000	0.9999993
8	0.0000000	0.9999992	0.0000000	0.9999992	0.0000000	0.9999992
9	0.0000000	0.9999991	0.0000000	0.9999991	0.0000000	0.9999991
10	0.0000000	0.9999990	0.0000000	0.9999990	0.0000000	0.9999990
11	0.0000000	0.9999989	0.0000000	0.9999989	0.0000000	0.9999989
12	0.0000000	0.9999988	0.0000000	0.9999988	0.0000000	0.9999988
13	0.0000000	0.9999987	0.0000000	0.9999987	0.0000000	0.9999987
14	0.0000000	0.9999986	0.0000000	0.9999986	0.0000000	0.9999986
15	0.0000000	0.9999985	0.0000000	0.9999985	0.0000000	0.9999985
16	0.0000000	0.9999984	0.0000000	0.9999984	0.0000000	0.9999984
17	0.0000000	0.9999983	0.0000000	0.9999983	0.0000000	0.9999983
18	0.0000000	0.9999982	0.0000000	0.9999982	0.0000000	0.9999982
19	0.0000000	0.9999981	0.0000000	0.9999981	0.0000000	0.9999981
20	0.0000000	0.9999980	0.0000000	0.9999980	0.0000000	0.9999980
21	0.0000000	0.9999979	0.0000000	0.9999979	0.0000000	0.9999979
22	0.0000000	0.9999978	0.0000000	0.9999978	0.0000000	0.9999978
23	0.0000000	0.9999977	0.0000000	0.9999977	0.0000000	0.9999977
24	0.0000000	0.9999976	0.0000000	0.9999976	0.0000000	0.9999976
25	0.0000000	0.9999975	0.0000000	0.9999975	0.0000000	0.9999975
26	0.0000000	0.9999974	0.0000000	0.9999974	0.0000000	0.9999974
27	0.0000000	0.9999973	0.0000000	0.9999973	0.0000000	0.9999973
28	0.0000000	0.9999972	0.0000000	0.9999972	0.0000000	0.9999972
29	0.0000000	0.9999971	0.0000000	0.9999971	0.0000000	0.9999971
30	0.0000000	0.9999970	0.0000000	0.9999970	0.0000000	0.9999970
31	0.0000000	0.9999969	0.0000000	0.9999969	0.0000000	0.9999969
32	0.0000000	0.9999968	0.0000000	0.9999968	0.0000000	0.9999968
33	0.0000000	0.9999967	0.0000000	0.9999967	0.0000000	0.9999967
34	0.0000000	0.9999966	0.0000000	0.9999966	0.0000000	0.9999966
35	0.0000000	0.9999965	0.0000000	0.9999965	0.0000000	0.9999965
36	0.0000000	0.9999964	0.0000000	0.9999964	0.0000000	0.9999964
37	0.0000000	0.9999963	0.0000000	0.9999963	0.0000000	0.9999963
38	0.0000000	0.9999962	0.0000000	0.9999962	0.0000000	0.9999962
39	0.0000000	0.9999961	0.0000000	0.9999961	0.0000000	0.9999961
40	0.0000000	0.9999960	0.0000000	0.9999960	0.0000000	0.9999960
41	0.0000000	0.9999959	0.0000000	0.9999959	0.0000000	0.9999959
42	0.0000000	0.9999958	0.0000000	0.9999958	0.0000000	0.9999958
43	0.0000000	0.9999957	0.0000000	0.9999957	0.0000000	0.9999957
44	0.0000000	0.9999956	0.0000000	0.9999956	0.0000000	0.9999956
45	0.0000000	0.9999955	0.0000000	0.9999955	0.0000000	0.9999955
46	0.0000000	0.9999954	0.0000000	0.9999954	0.0000000	0.9999954
47	0.0000000	0.9999953	0.0000000	0.9999953	0.0000000	0.9999953
48	0.0000000	0.9999952	0.0000000	0.9999952	0.0000000	0.9999952
49	0.0000000	0.9999951	0.0000000	0.9999951	0.0000000	0.9999951
50	0.0000000	0.9999950	0.0000000	0.9999950	0.0000000	0.9999950
51	0.0000000	0.9999949	0.0000000	0.9999949	0.0000000	0.9999949
52	0.0000000	0.9999948	0.0000000	0.9999948	0.0000000	0.9999948
53	0.0000000	0.9999947	0.0000000	0.9999947	0.0000000	0.9999947
54	0.0000000	0.9999946	0.0000000	0.9999946	0.0000000	0.9999946
55	0.0000000	0.9999945	0.0000000	0.9999945	0.0000000	0.9999945
56	0.0000000	0.9999944	0.0000000	0.9999944	0.0000000	0.9999944
57	0.0000000	0.9999943	0.0000000	0.9999943	0.0000000	0.9999943
58	0.0000000	0.9999942	0.0000000	0.9999942	0.0000000	0.9999942
59	0.0000000	0.9999941	0.0000000	0.9999941	0.0000000	0.9999941
60	0.0000000	0.9999940	0.0000000	0.9999940	0.0000000	0.9999940
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.

C

81 Degrees.

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.00538,01	0.80566,76	4.59716,62	0.40283,38	0.00269,00	4.99730,99	60
1	0.00540,01	0.80487,07	4.59756,46	0.40243,54	0.00270,01	4.99729,99	59
2	542,02	80407,53	59796,23	40203,77	271,01	728,99	58
3	544,03	80328,14	59835,93	40164,07	272,02	727,98	57
4	546,04	80248,00	59875,55	40124,45	273,02	726,98	56
5	548,06	80169,81	59915,09	40084,91	274,03	725,97	55
6	550,08	80090,87	59954,56	40045,43	275,04	724,96	54
7	552,11	80012,07	59993,96	40006,04	276,05	723,94	53
8	554,13	79933,42	60033,29	39966,71	277,07	722,93	52
9	556,17	79854,91	60072,54	39927,46	278,08	721,91	51
10	558,20	79776,55	60111,72	39888,28	279,10	720,90	50
11	0.00560,25	0.79698,33	4.60150,83	0.39849,16	0.00280,12	4.99719,87	49
12	562,29	79620,26	60189,87	39810,13	281,15	718,85	48
13	564,34	79542,34	60228,83	39771,17	282,17	717,83	47
14	566,39	79464,51	60267,72	39732,28	283,19	716,80	46
15	568,44	79386,91	60306,54	39693,46	284,22	715,77	45
16	570,50	79309,41	60345,29	39654,71	285,25	714,75	44
17	572,57	79232,05	60383,97	39616,03	286,28	713,71	43
18	574,63	79154,84	60422,58	39577,42	287,32	712,68	42
19	576,70	79077,76	60461,12	39538,88	288,35	711,65	41
20	578,78	79000,83	60499,58	39500,41	289,39	710,61	40
21	0.00580,86	0.78924,03	4.60537,98	0.39462,02	0.00290,43	4.99709,57	39
22	582,94	78847,37	60576,31	39423,68	291,47	708,53	38
23	585,02	78770,86	60614,57	39385,43	292,51	707,49	37
24	587,11	78694,48	60652,76	39347,24	293,55	706,44	36
25	589,21	78618,24	60690,88	39309,12	294,61	705,39	35
26	591,30	78542,13	60728,93	39271,07	295,65	704,35	34
27	593,41	78466,16	60766,92	39233,08	296,71	703,29	33
28	595,51	78390,33	60804,83	39195,16	297,75	702,24	32
29	597,62	78314,64	60842,68	39157,32	298,81	701,19	31
30	599,73	78239,08	60880,46	39119,54	299,87	700,13	30
31	0.00601,85	0.78163,65	4.60918,17	0.39081,83	0.00300,93	4.99699,07	29
32	603,97	78088,16	60955,82	39044,18	301,98	698,02	28
33	606,09	78013,20	60993,40	39006,60	303,04	696,95	27
34	608,22	77938,18	61030,91	38969,09	304,11	695,89	26
35	610,35	77863,29	61068,35	38931,65	305,17	694,82	25
36	612,48	77788,53	61105,78	38894,22	306,24	693,76	24
37	614,62	77713,91	61143,04	38856,96	307,33	692,69	23
38	616,76	77639,41	61180,29	38819,71	308,38	691,62	22
39	618,91	77565,05	61217,47	38782,52	309,45	690,54	21
40	621,06	77490,82	61254,59	38745,41	310,53	689,47	20
41	0.00623,21	0.77416,72	4.61291,64	0.38708,36	0.00311,61	4.99688,39	19
42	623,37	77342,75	61288,62	38671,37	312,68	688,31	18
43	625,53	77268,90	61365,55	38634,45	313,77	686,23	17
44	627,70	77195,19	61402,40	38597,59	314,85	685,15	16
45	629,87	77121,61	61439,19	38560,81	315,94	684,06	15
46	632,04	77048,15	61475,92	38524,08	317,02	682,98	14
47	634,22	76974,82	61512,59	38487,41	318,11	681,89	13
48	636,40	76901,62	61549,19	38450,81	319,20	680,80	12
49	640,58	76828,55	61585,72	38414,27	320,29	679,71	11
50	642,77	76755,60	61622,20	38377,80	321,39	678,61	10
51	0.00644,96	0.76682,178	4.61658,61	0.38341,39	0.00322,48	4.99677,52	9
52	647,15	76610,08	61649,96	38305,04	323,58	676,42	8
53	649,35	76537,51	61731,24	38268,76	324,67	675,32	7
54	651,56	76465,06	61767,47	38232,53	325,78	674,22	6
55	653,76	76392,74	61803,63	38196,37	326,88	673,12	5
56	655,97	76320,54	61839,73	38160,27	327,99	672,01	4
57	658,19	76248,47	61875,76	38124,23	329,09	670,90	3
58	660,41	76176,51	61911,74	38088,26	330,21	669,79	2
59	662,63	76104,68	61947,66	38052,34	331,32	668,68	1
60	664,85	76032,98	61983,51	38016,49	332,43	667,57	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

10 Degrees.

II

Nr.	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.00674,85	0.76032,98	4.61983,51	0.38016,49	0.00332,43	4.99667,57	60
1	0.00667,08	0.74961,39	4.62019,30	0.37980,69	0.00333,54	4.99666,46	59
2	669,32	75889,93	62055,03	37944,97	334,66	665,34	58
3	671,55	75815,59	62090,70	37909,29	335,77	664,22	57
4	673,79	75747,36	62126,32	37873,68	336,89	663,10	56
5	676,04	75676,26	62161,87	37838,13	338,02	661,98	55
6	678,29	75605,28	62197,36	37802,64	339,15	660,85	54
7	680,54	75534,42	62232,79	37767,21	340,27	659,73	53
8	682,80	75463,68	62268,16	37731,84	341,40	658,60	52
9	685,06	75393,05	62303,47	37696,53	342,53	657,47	51
10	687,32	75322,54	62338,73	37661,27	343,66	656,34	50
11	0.00689,59	0.74522,16	4.62374,92	0.37626,08	0.00344,79	4.99656,20	49
12	691,86	75281,89	62409,05	37590,95	345,93	654,07	48
13	694,13	75111,73	62444,13	37555,87	347,07	652,93	47
14	696,41	75041,70	62479,15	37520,85	348,21	651,79	46
15	698,69	74471,78	62514,11	37485,89	349,34	650,65	45
16	700,98	74901,97	62549,01	37450,99	350,49	649,51	44
17	703,27	74832,28	62584,86	37416,14	351,64	648,36	43
18	705,56	74762,71	62619,64	37381,35	352,78	647,22	42
19	707,86	74693,25	62654,36	37346,63	353,93	646,07	41
20	710,16	74623,91	62688,04	37311,95	355,08	644,92	40
21	0.00712,47	0.74554,68	4.62722,66	0.37277,34	0.00356,23	4.99643,76	39
22	714,78	74485,56	62757,22	37242,78	357,39	642,61	38
23	717,09	74416,56	62791,72	37208,28	358,55	641,45	37
24	719,41	74347,67	62826,16	37173,84	359,71	640,29	36
25	721,73	74278,90	62860,55	37139,45	360,86	639,13	35
26	724,05	74210,23	62894,88	37105,11	362,03	637,97	34
27	726,38	74141,68	62929,16	37070,84	363,19	636,81	33
28	728,71	74073,24	62963,38	37036,62	364,35	635,64	32
29	731,05	74004,91	62997,54	37002,45	365,53	634,47	31
30	733,39	73936,70	63031,65	36968,35	366,60	633,30	30
31	0.00735,73	0.73868,39	4.63065,70	0.36984,30	0.00367,87	4.99632,13	29
32	738,08	73800,59	63099,70	36900,29	369,04	630,96	28
33	740,43	73732,71	63133,64	36866,36	370,22	629,78	27
34	742,78	73664,93	63167,53	36832,47	371,39	628,61	26
35	745,14	73597,29	63201,37	36808,63	372,57	627,43	25
36	747,50	73529,70	63235,15	36864,75	373,75	626,25	24
37	749,87	73462,25	63268,87	36731,13	374,94	625,06	23
38	752,24	73394,91	63302,54	36697,45	376,12	623,88	22
39	754,61	73327,68	63336,16	36663,84	377,31	622,69	21
40	756,99	73260,55	63369,72	36630,28	378,40	621,50	20
41	0.00759,37	0.73193,63	4.63403,23	0.36596,76	0.00379,68	4.99620,31	19
42	761,76	73126,62	63436,69	36563,31	380,88	619,12	18
43	764,15	73059,81	63470,09	36529,91	382,07	617,93	17
44	766,54	72993,11	63503,44	36496,55	383,27	616,73	16
45	768,94	72926,52	63536,74	36463,26	384,47	615,53	15
46	771,34	72860,03	63569,98	36430,02	385,67	614,33	14
47	773,74	72793,65	63603,17	36396,83	386,87	613,13	13
48	776,15	72727,37	63636,31	36363,68	388,08	611,92	12
49	778,56	72661,20	63669,40	36330,60	389,28	610,72	11
50	780,98	72595,13	63702,43	36297,56	390,49	609,51	10
51	0.00783,40	0.72529,17	4.63735,47	0.36264,59	0.00391,70	4.99608,30	9
52	785,82	72463,31	63738,34	36231,66	392,91	607,09	8
53	788,25	72397,55	63801,22	36198,77	394,12	605,87	7
54	790,68	72331,89	63834,05	36165,95	395,34	604,66	6
55	793,11	72266,34	63866,83	36133,17	396,56	603,44	5
56	795,55	72200,89	63899,55	36100,45	397,77	602,22	4
57	797,99	72135,55	63932,22	36067,77	398,99	601,00	3
58	800,44	72070,30	63964,85	36035,15	400,22	599,78	2
59	802,89	72005,16	63997,42	36002,58	401,45	598,55	1
60	805,24	71940,12	64029,94	35970,06	402,67	597,33	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

77 Degrees.

M.	Seconds.	Corrections.	Half Sines.	Half Coses.	Half Sec.	Half Tan.	M.
0	0.00805,34	0.71940,12	4.64029,94	0.35970,08	0.00404,67	4.08997,28	85
1	0.00807,86	0.71875,17	4.64062,41	0.35937,59	0.00404,00	4.09000,16	86
2	810,26	71810,33	64094,83	35905,17	405,13	594,87	87
3	812,73	71745,59	64127,20	35872,79	406,36	593,63	88
4	815,20	71680,95	64159,52	35840,48	407,60	592,40	89
5	817,67	71616,41	64191,79	35808,20	408,84	591,16	90
6	820,14	71551,97	64224,01	35774,99	410,07	589,93	91
7	822,63	71487,63	64256,18	35743,82	411,32	588,68	92
8	825,11	71423,39	64288,30	35711,69	412,55	587,44	93
9	827,60	71359,24	64320,38	35679,62	413,80	586,20	94
10	830,09	71295,20	64352,42	35647,60	415,03	584,95	95
11	0.00832,59	0.71231,25	4.64384,87	0.35615,63	0.00416,29	4.09053,70	96
12	835,08	71168,40	64426,80	35583,70	417,54	583,46	97
13	837,59	71103,64	64458,18	35551,82	418,79	582,20	98
14	840,10	71039,99	64489,00	35519,99	420,05	579,95	99
15	842,63	70976,43	64511,78	35488,22	421,31	578,69	100
16	845,12	70912,96	64543,52	35456,48	422,56	577,44	101
17	847,64	70849,60	64575,20	35424,80	423,82	576,18	102
18	850,16	70786,33	64606,83	35393,17	425,08	574,92	103
19	852,69	70723,15	64638,42	35361,58	426,35	573,65	104
20	855,22	70660,07	64669,97	35330,09	427,61	572,39	105
21	0.00857,75	0.70597,09	4.64701,45	0.35298,54	0.00428,88	4.09071,12	106
22	860,29	70534,20	64762,90	35266,10	430,15	569,85	107
23	862,83	70471,41	64764,29	35235,71	431,42	568,58	108
24	865,38	70408,71	64795,54	35204,35	432,69	567,31	109
25	867,93	70346,10	64826,65	35173,05	433,97	566,03	110
26	870,48	70283,59	64858,20	35141,79	435,24	564,76	111
27	873,04	70221,17	64889,41	35110,59	436,52	563,48	112
28	875,60	70158,84	64920,58	35079,42	437,80	562,20	113
29	878,16	70096,61	64951,69	35048,21	439,08	560,92	114
30	880,73	70034,27	64982,76	35017,24	440,37	559,69	115
31	0.00883,30	0.69972,42	4.65013,79	0.34986,21	0.00441,65	4.09086,35	116
32	883,88	69910,47	65044,76	34955,24	442,94	558,06	117
33	886,46	69848,60	65075,70	34924,80	444,23	556,77	118
34	889,04	69786,83	65106,58	34893,42	445,52	555,48	119
35	891,63	69725,15	65137,42	34862,58	446,81	554,18	120
36	894,22	69663,56	65168,22	34831,78	448,11	552,89	121
37	896,81	69602,06	65198,97	34801,03	449,41	551,59	122
38	904,41	69540,66	65229,67	34770,33	450,71	549,99	123
39	904,02	69479,34	65260,33	34739,77	452,01	547,99	124
40	906,62	69418,11	65290,94	34709,06	453,31	546,69	125
41	0.00909,23	0.69356,97	4.65321,51	0.34678,49	0.00454,62	4.09095,38	126
42	911,85	69295,93	65352,03	34647,96	455,62	544,07	127
43	914,47	69234,97	65382,51	34617,49	457,23	542,76	128
44	917,09	69174,10	65412,95	34587,05	458,55	541,45	129
45	919,71	69113,32	65443,34	34556,66	459,86	540,14	130
46	922,34	69052,63	65473,68	34526,32	461,17	538,83	131
47	924,98	68992,02	65503,99	34496,01	462,49	537,01	132
48	927,61	68931,51	65534,24	34465,75	463,81	535,19	133
49	930,26	68871,08	65564,46	34435,54	465,13	533,87	134
50	932,90	68810,72	65594,63	34405,37	466,45	532,55	135
51	0.00937,55	0.68750,49	4.65624,75	0.34375,25	0.00467,77	4.09103,22	136
52	938,20	68690,32	65654,84	34345,16	467,77	530,90	137
53	940,86	68630,24	65684,88	34315,12	470,43	529,57	138
54	943,53	68570,25	65714,87	34285,13	471,76	528,24	139
55	946,18	68510,35	65744,82	34255,18	473,09	526,91	140
56	948,85	68450,53	65774,73	34225,26	474,43	525,57	141
57	951,52	68390,79	65804,60	34195,40	475,76	524,24	142
58	954,20	68331,15	65834,42	34165,57	477,10	522,90	143
59	956,88	68271,59	65864,10	34135,79	478,44	521,56	144
60	959,56	68212,11	65893,94	34106,06	479,78	520,22	145
M.	Corrections.	Seconds.	Half Cos.	Half Sec.	Half Cotes.	Half Sines.	M.

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.00959.56	0.68112.11	4.65893.94	0.34106.06	0.00179.78	4.99520.22	60
1	0.00968.24	0.68152.72	4.65923.62	0.34076.36	0.00181.18	4.99518.87	59
2	0.00976.94	0.68193.41	4.65953.29	0.34046.71	0.00182.47	4.99517.53	58
3	0.00985.63	0.68234.19	4.65982.40	0.34017.09	0.00183.81	4.99516.18	57
4	0.00994.33	0.68275.05	4.66012.47	0.33987.53	0.00185.17	4.99514.83	56
5	0.01003.03	0.68316.00	4.66042.00	0.33958.00	0.00186.52	4.99513.48	55
6	0.01011.74	0.68357.03	4.66071.48	0.33928.52	0.00187.87	4.99512.13	54
7	0.01020.45	0.68398.14	4.66100.93	0.33899.07	0.00189.23	4.99510.77	53
8	0.01029.17	0.68439.34	4.66130.33	0.33869.67	0.00190.58	4.99509.41	52
9	0.01037.88	0.68480.62	4.66159.69	0.33840.31	0.00191.94	4.99508.06	51
10	0.01046.61	0.68521.98	4.66189.01	0.33810.99	0.00193.31	4.99506.69	50
11	0.01055.33	0.68563.43	4.66218.28	0.33781.72	0.00194.66	4.99499.16	49
12	0.01064.06	0.68604.95	4.66247.52	0.33752.47	0.00196.03	4.99497.48	48
13	0.01072.79	0.68646.56	4.66276.72	0.33723.28	0.00197.39	4.99495.60	47
14	0.01081.53	0.68688.26	4.66305.87	0.33694.13	0.00198.77	4.99493.72	46
15	0.01090.27	0.68730.03	4.66334.98	0.33665.02	0.00200.14	4.99491.86	45
16	0.01099.02	0.68771.89	4.66364.05	0.33635.95	0.00201.51	4.99489.94	44
17	0.01107.77	0.68813.83	4.66393.08	0.33606.92	0.00202.89	4.99488.01	43
18	0.01116.52	0.68855.84	4.66422.08	0.33577.92	0.00204.26	4.99486.07	42
19	0.01125.27	0.68897.94	4.66451.03	0.33548.97	0.00205.68	4.99484.11	41
20	0.01134.03	0.68940.12	4.66479.94	0.33520.06	0.00207.02	4.99482.14	40
21	0.01142.80	0.68982.39	4.66508.80	0.33491.19	0.00208.40	4.99479.16	39
22	0.01151.57	0.69024.73	4.66537.63	0.33462.37	0.00209.79	4.99477.18	38
23	0.01160.34	0.69067.15	4.66566.42	0.33433.57	0.00211.17	4.99475.19	37
24	0.01169.11	0.69109.65	4.66595.17	0.33404.83	0.00212.55	4.99473.19	36
25	0.01177.89	0.69152.23	4.66623.88	0.33376.12	0.00213.95	4.99471.18	35
26	0.01186.68	0.69194.89	4.66652.55	0.33347.45	0.00215.34	4.99469.16	34
27	0.01195.46	0.69237.63	4.66681.18	0.33318.82	0.00216.73	4.99467.13	33
28	0.01204.26	0.69280.45	4.66709.77	0.33290.23	0.00218.13	4.99465.09	32
29	0.01213.05	0.69323.35	4.66738.32	0.33261.68	0.00219.53	4.99463.04	31
30	0.01221.85	0.69366.32	4.66766.84	0.33233.16	0.00220.93	4.99460.97	30
31	0.01230.65	0.69409.38	4.66795.31	0.33204.69	0.00222.33	4.99458.89	29
32	0.01239.46	0.69452.51	4.66823.74	0.33176.25	0.00223.73	4.99456.79	28
33	0.01248.27	0.69495.72	4.66852.14	0.33147.86	0.00225.14	4.99454.67	27
34	0.01257.08	0.69539.01	4.66880.49	0.33119.51	0.00226.52	4.99452.54	26
35	0.01265.90	0.69582.37	4.66908.81	0.33091.19	0.00227.95	4.99450.39	25
36	0.01274.72	0.69625.82	4.66937.09	0.33062.91	0.00229.36	4.99448.24	24
37	0.01283.55	0.69669.35	4.66965.32	0.33034.68	0.00230.77	4.99446.07	23
38	0.01292.38	0.69712.94	4.66993.53	0.33006.47	0.00232.19	4.99443.89	22
39	0.01301.21	0.69756.62	4.67021.69	0.32978.31	0.00233.61	4.99441.69	21
40	0.01310.05	0.69800.37	4.67049.81	0.32950.19	0.00235.03	4.99439.47	20
41	0.01318.89	0.69844.20	4.67077.90	0.32922.10	0.00236.44	4.99437.25	19
42	0.01327.73	0.69888.10	4.67105.95	0.32894.05	0.00237.87	4.99435.01	18
43	0.01336.58	0.69932.08	4.67133.96	0.32866.04	0.00239.29	4.99432.77	17
44	0.01345.44	0.69976.14	4.67161.93	0.32838.07	0.00240.72	4.99430.51	16
45	0.01354.29	0.70020.27	4.67189.86	0.32810.14	0.00242.14	4.99428.25	15
46	0.01363.16	0.70064.48	4.67217.76	0.32782.24	0.00243.58	4.99425.97	14
47	0.01371.92	0.70108.76	4.67245.62	0.32754.38	0.00245.01	4.99423.68	13
48	0.01380.79	0.70153.12	4.67273.44	0.32726.56	0.00246.45	4.99421.37	12
49	0.01389.67	0.70197.55	4.67301.22	0.32698.78	0.00247.88	4.99419.04	11
50	0.01398.53	0.70242.06	4.67328.97	0.32671.03	0.00249.32	4.99416.69	10
51	0.01407.41	0.70286.64	4.67356.68	0.32643.32	0.00250.76	4.99414.32	9
52	0.01416.29	0.70331.30	4.67384.35	0.32615.65	0.00252.20	4.99411.94	8
53	0.01425.17	0.70376.03	4.67411.98	0.32588.03	0.00253.65	4.99409.54	7
54	0.01434.05	0.70420.83	4.67439.58	0.32560.42	0.00255.09	4.99407.13	6
55	0.01442.93	0.70465.71	4.67467.14	0.32532.86	0.00256.53	4.99404.71	5
56	0.01451.81	0.70510.66	4.67494.67	0.32505.33	0.00257.98	4.99402.28	4
57	0.01460.70	0.70555.68	4.67522.16	0.32477.84	0.00259.44	4.99400.84	3
58	0.01469.58	0.70600.78	4.67549.61	0.32450.39	0.00260.89	4.99398.39	2
59	0.01478.46	0.70645.95	4.67577.02	0.32422.97	0.00262.35	4.99395.93	1
60	0.01487.34	0.70691.20	4.67604.40	0.32395.60	0.00263.81	4.99393.46	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

M	Secants.	Colecants	Half Sines	Half Cosec.	Half Sec.	Half Cof.	M
0	0.01127,61	0.64791,20	4.67604,40	0.32395,60	0.00563,81	4.99436,19	60
1	0.01130,58	0.64736,51	4.67731,74	0.32268,26	0.00565,27	4.99434,73	59
2	1133,45	64681,90	67659,06	32340,95	566,73	433,27	58
3	1136,37	64627,36	67686,32	32313,68	568,18	431,81	57
4	1139,30	64572,90	67713,55	32286,45	569,65	430,35	56
5	1142,24	64518,50	67740,75	32259,25	571,12	428,88	55
6	1145,18	64464,18	67767,91	32232,09	572,59	427,42	54
7	1148,12	64409,93	67795,03	32204,97	574,06	425,94	53
8	1151,06	64355,74	67822,13	32177,87	575,53	424,47	52
9	1154,01	64301,64	67849,18	32150,82	577,01	422,99	51
10	1156,97	64247,60	67876,20	32123,80	578,49	421,51	50
11	0.01159,92	0.64193,62	4.67903,18	0.32096,81	0.00579,96	4.99430,04	49
12	1162,88	64139,73	67930,13	32069,87	581,44	418,56	48
13	1165,85	64085,91	67957,04	32042,96	582,92	417,07	47
14	1168,82	64032,15	67983,92	32016,07	584,41	415,59	46
15	1171,79	63978,46	68010,77	31989,23	585,89	414,10	45
16	1174,77	63924,85	68037,57	31962,43	587,39	412,61	44
17	1177,75	63871,30	68064,35	31935,65	588,87	411,12	43
18	1180,73	63817,83	68091,08	31908,92	590,37	409,63	42
19	1183,72	63764,42	68117,79	31882,21	591,89	408,14	41
20	1186,71	63711,08	68144,46	31855,54	593,85	406,14	40
21	0.01189,71	0.63657,81	4.68171,09	0.31828,91	0.00594,86	4.99405,14	39
22	1192,71	63604,61	68197,69	31801,30	596,36	403,64	38
23	1195,71	63551,48	68224,26	31775,74	597,86	402,14	37
24	1198,72	63498,22	68250,79	31749,21	599,36	400,64	36
25	1201,73	63445,42	68277,29	31722,71	600,87	399,13	35
26	1204,75	63392,50	68303,75	31696,25	602,37	397,62	34
27	1207,77	63339,64	68330,18	31669,82	603,88	396,11	33
28	1210,79	63286,85	68356,57	31643,43	605,39	394,60	32
29	1213,82	63234,13	68382,93	31617,07	606,91	393,09	31
30	1216,85	63181,47	68409,26	31590,74	608,43	391,57	30
31	0.01219,88	0.63128,89	4.68435,55	0.31564,45	0.00609,94	4.99390,06	29
32	1222,92	63076,37	68461,81	31538,18	611,46	388,54	28
33	1225,96	63023,92	68488,04	31511,96	612,98	387,02	27
34	1229,01	62971,53	68514,23	31485,77	614,51	385,49	26
35	1232,06	62919,21	68540,39	31459,61	616,03	383,97	25
36	1235,12	62866,96	68566,52	31433,48	617,56	382,44	24
37	1238,17	62814,77	68592,61	31407,39	619,08	380,91	23
38	1241,24	62762,65	68618,67	31381,33	620,62	379,38	22
39	1244,30	62710,60	68644,70	31355,30	622,15	377,85	21
40	1247,37	62658,61	68670,69	31329,31	623,69	376,31	20
41	0.01250,46	0.62606,69	4.68696,65	0.31303,46	0.00625,22	4.99374,47	19
42	1253,52	62554,83	68722,58	31277,42	625,76	373,24	18
43	1256,61	62503,04	68748,48	31251,52	628,31	371,69	17
44	1259,69	62451,32	68774,34	31225,66	629,85	370,15	16
45	1262,78	62399,66	68800,17	31199,83	631,39	368,61	15
46	1265,87	62348,06	68825,97	31174,03	632,94	367,06	14
47	1268,97	62296,53	68851,73	31148,26	634,48	365,51	13
48	1272,07	62245,07	68877,46	31122,54	636,04	363,96	12
49	1275,18	62193,67	68903,16	31096,84	637,59	362,41	11
50	1278,29	62142,33	68928,83	31071,17	639,15	360,85	10
51	0.01281,40	0.62091,06	4.68954,47	0.31045,53	0.00640,70	4.99359,30	9
52	1284,41	62039,85	68980,07	31019,92	642,26	357,74	8
53	1287,54	61988,71	69005,64	30994,36	643,82	356,18	7
54	1290,66	61937,63	69031,12	30968,81	645,38	354,62	6
55	1293,89	61886,61	69056,69	30943,31	646,95	353,05	5
56	1297,02	61835,96	69082,17	30917,83	648,51	351,49	4
57	1300,16	61784,77	69107,61	30892,39	650,08	349,92	3
58	1303,30	61733,95	69133,02	30866,97	651,65	348,35	2
59	1306,44	61683,18	69158,41	30841,59	653,22	346,78	1
60	1309,59	61632,48	69183,76	30816,24	654,79	345,20	0
M	Colecants.	Secants.	Half Cof.	Half Sec.	Half Cosec.	Half Sines.	M

14. Degrees.

15

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.01309,59	0.61631,48	4.69183,76	0.30816,24	0.00654,79	4.99345,20	60
1	0.01312,74	0.61581,85	4.69209,07	0.30790,93	0.00650,87	4.99343,63	59
2	1315,90	61531,27	69234,86	30765,64	657,95	342,05	58
3	1319,06	61480,76	69259,61	30740,38	659,53	340,47	57
4	1322,22	61430,31	69284,84	30715,16	661,11	338,89	56
5	1325,39	61379,93	69310,04	30689,96	662,69	337,30	55
6	1328,56	61329,00	69335,20	30664,80	664,28	335,72	54
7	1331,73	61279,33	69360,33	30639,66	665,87	334,13	53
8	1334,91	61229,13	69385,43	30614,57	667,45	332,54	52
9	1338,09	61178,99	69410,50	30589,49	669,03	330,95	51
10	1341,28	61128,91	69435,54	30564,46	670,64	329,36	50
11	0.01344,47	0.61078,89	4.69460,55	0.30539,45	0.00671,74	4.99377,6	49
12	1347,67	11028,94	69485,53	30514,47	673,83	326,26	48
13	1350,87	60979,04	69510,48	30489,53	675,44	324,66	47
14	1354,07	60929,21	69535,39	30469,11	677,04	322,96	46
15	1357,27	60879,43	69560,28	30439,71	678,63	321,36	45
16	1360,48	60829,72	69585,14	30414,86	680,24	319,76	44
17	1363,70	60780,07	69609,96	30390,04	681,85	318,15	43
18	1366,92	60730,48	69634,76	30365,24	683,46	316,54	42
19	1370,14	60680,05	69659,52	30340,47	685,07	314,93	41
20	1373,37	60631,48	69684,26	30315,74	686,68	313,31	40
21	0.01376,60	0.60582,06	4.69708,97	0.30291,03	0.00688,30	4.99311,70	39
22	1379,83	60532,71	69733,64	30266,36	689,92	310,68	38
23	1383,07	60483,42	69758,29	30241,71	691,54	308,46	37
24	1386,31	60434,19	69782,90	30217,09	693,16	306,34	36
25	1389,55	10385,01	69807,49	30192,51	694,77	305,22	35
26	1392,80	60335,90	69832,05	30167,95	696,40	303,60	34
27	1396,06	60286,85	69856,57	30143,43	698,03	301,97	33
28	1399,31	60237,85	69881,07	30118,92	699,65	300,34	32
29	1402,58	60188,91	69905,54	30094,46	701,29	298,71	31
30	1405,84	60140,04	69929,98	30070,02	702,92	297,08	30
31	0.01409,11	0.60091,22	4.69954,39	0.30045,61	0.00704,56	4.99295,44	29
32	1412,38	60042,46	69968,77	30021,23	706,19	293,81	28
33	1415,66	59993,75	70003,12	29996,87	707,83	292,17	27
34	1418,94	59945,11	70027,44	29972,56	709,47	290,53	26
35	1422,23	59896,52	70052,74	29948,26	711,12	288,88	25
36	1425,51	59847,99	70076,00	29923,99	712,76	287,24	24
37	1428,81	59799,52	70100,24	29899,76	714,41	285,59	23
38	1432,10	95751,11	70124,44	29875,55	716,05	283,95	22
39	1435,40	59702,76	70148,62	29851,38	717,70	282,30	21
40	1438,71	59654,46	70172,77	29827,13	719,36	280,64	20
41	0.01442,02	0.59606,22	4.70196,89	0.29803,11	0.00721,01	4.99278,99	19
42	1445,33	59558,04	70220,98	29779,02	722,66	277,33	18
43	1448,65	59509,91	70245,04	29754,96	724,33	275,67	17
44	1451,97	59461,84	70269,08	29730,92	725,99	274,01	16
45	1455,29	59413,83	70293,08	29706,92	727,64	272,35	15
46	1458,62	59365,87	70317,06	29682,94	729,31	270,69	14
47	1461,95	59317,97	70341,01	29658,99	730,98	269,02	13
48	1465,29	59270,13	70364,93	29635,07	732,64	267,35	12
49	1468,62	59222,34	70388,83	29611,17	734,31	265,69	11
50	1471,97	59174,61	70412,69	29587,31	735,99	264,01	10
51	0.01475,32	0.59126,94	4.70436,53	0.29563,47	0.00737,66	4.99261,34	9
52	1478,67	59079,32	70460,34	29539,66	739,34	260,66	8
53	1482,02	59031,76	70484,12	29515,88	741,01	258,99	7
54	1485,38	58984,25	70507,87	29492,12	742,69	257,31	6
55	1488,75	58936,80	70531,60	29468,40	744,38	255,62	5
56	1492,11	58889,41	70555,29	29444,71	746,06	253,94	4
57	1495,48	58842,07	70578,96	29421,04	747,74	252,26	3
58	1498,86	58794,78	70602,61	29397,39	749,43	250,57	2
59	1502,24	58747,55	70626,11	29373,77	751,12	248,88	1
60	1505,62	58700,38	70639,81	29350,19	752,81	247,19	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

75 Degrees.

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.01505,63	0.58700,38	4.70649,81	0.29350,19	0.00752,81	4.99247,19	60
1	0.01509,01	0.58653,26	4.60673,36	0.29326,62	0.00754,51	4.99245,49	59
2	1512,40	58606,19	70696,90	29303,10	756,20	243,80	58
3	1515,80	58559,18	70720,41	29279,59	757,90	242,10	57
4	1519,19	58512,22	70743,89	29256,11	759,59	240,40	56
5	1522,60	58465,32	70767,34	29232,66	761,30	238,70	55
6	1526,00	58418,48	70790,76	29209,24	763,00	237,00	54
7	1529,41	58371,68	70814,16	29185,84	764,70	235,29	53
8	1532,83	58324,94	70837,53	29162,47	766,42	233,58	52
9	1536,25	58278,26	70860,87	29139,13	768,13	231,87	51
10	1539,67	58231,63	70884,18	29115,81	769,84	230,16	50
11	0.01543,10	0.58185,05	4.70907,47	0.29092,53	0.00771,55	4.99228,45	49
12	1546,53	58138,52	70930,74	29069,26	773,26	228,73	48
13	1549,96	58092,05	70953,97	29046,03	774,98	227,02	47
14	1553,40	58045,64	70977,18	29022,82	776,70	225,30	46
15	1556,84	57999,27	71000,36	28999,63	778,42	223,58	45
16	1560,29	57952,96	71023,52	28976,48	780,15	221,85	44
17	1563,74	57906,70	71046,65	28953,35	781,87	220,13	43
18	1567,19	57860,50	71069,75	28930,25	783,59	218,40	42
19	1570,65	57814,34	71092,83	28907,17	785,33	216,67	41
20	1574,11	57768,24	71115,88	28884,12	787,06	214,94	40
21	0.01577,58	0.57722,20	4.71138,80	0.28861,10	0.00788,79	4.99211,21	39
22	1581,05	57676,20	71161,90	28838,10	790,53	209,47	38
23	1584,52	57630,26	71184,87	28815,13	792,26	207,74	37
24	1588,00	57584,37	71207,81	28792,19	794,00	206,00	36
25	1591,48	57538,53	71230,73	28769,26	795,74	204,26	35
26	1594,97	57492,74	71253,63	28746,37	797,48	202,51	34
27	1598,46	57447,01	71276,49	28723,51	799,23	200,77	33
28	1601,95	57401,33	71299,33	28700,66	800,97	199,02	32
29	1605,45	57355,70	71322,15	28677,85	802,73	197,27	31
30	1608,96	57310,12	71344,94	28655,06	804,48	195,52	30
31	0.01612,45	0.57264,59	4.71367,70	0.28632,29	0.00806,23	4.99193,77	29
32	1615,96	57219,11	71390,44	28609,56	807,98	192,02	28
33	1619,48	57173,69	71413,15	28586,84	809,74	190,26	27
34	1622,99	57128,31	71435,84	28564,16	811,49	188,50	26
35	1626,52	57082,99	71458,50	28541,49	813,26	186,74	25
36	1630,04	57037,72	71481,14	28518,86	815,02	184,98	24
37	1633,57	56992,50	71503,75	28496,25	816,78	183,21	23
38	1637,10	56947,33	71526,33	28473,66	818,55	181,45	22
39	1640,64	56902,21	71548,89	28451,11	820,32	179,68	21
40	1644,18	56857,14	71571,43	28428,57	822,09	177,91	20
41	0.01647,73	0.56812,12	4.71593,94	0.28406,06	0.00823,57	4.99176,13	19
42	1651,28	56767,15	71616,42	28383,58	823,84	176,13	18
43	1654,83	56722,23	71638,88	28361,12	825,61	174,36	17
44	1658,39	56677,36	71661,32	28338,68	827,41	172,58	16
45	1661,95	56632,54	71683,73	28316,27	829,20	170,80	15
46	1665,51	56587,77	71706,11	28293,89	831,00	169,02	14
47	1669,08	56543,06	71728,47	28271,53	832,76	167,24	13
48	1672,65	56498,39	71750,80	28249,20	834,54	165,46	12
49	1676,23	56453,77	71773,11	28226,88	836,33	163,67	11
50	1679,81	56409,20	71795,40	28204,60	838,12	161,88	10
51	0.01683,39	0.56364,68	4.71817,66	0.28182,34	0.00841,69	4.99158,30	9
52	1686,98	56320,20	71839,90	28160,10	843,49	156,51	8
53	1690,58	56275,78	71862,11	28137,89	845,29	154,71	7
54	1694,17	56231,41	71884,29	28115,70	847,09	152,91	6
55	1697,77	56187,08	71906,46	28093,54	848,88	151,11	5
56	1701,38	56142,81	71928,59	28071,41	850,69	149,31	4
57	1704,99	56098,58	71950,71	28049,29	852,40	147,50	3
58	1708,60	56054,40	71972,80	28027,20	854,30	145,70	2
59	1712,22	56010,27	71994,86	28005,14	856,11	143,89	1
60	1715,86	55966,19	72016,90	27983,10	857,92	142,08	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.0175,84	0.55966,19	4.72016,90	0.27983,10	0.00856,92	4.99142,08	60
1	0.01719,46	0.55922,16	4.72038,92	0.27961,08	0.00859,73	4.99140,27	59
2	0.01723,09	0.55878,18	4.72060,91	0.27989,09	86,134	138,445	58
3	0.01726,72	0.55834,24	4.72082,88	0.27917,12	862,36	136,64	57
4	0.01730,36	0.55790,35	4.72104,82	0.27895,17	865,18	134,82	56
5	0.01734,00	0.55746,51	4.72126,74	0.27873,26	867,00	133,00	55
6	0.01737,64	0.55702,72	4.72148,64	0.27851,36	868,82	131,18	54
7	0.01741,29	0.55658,97	4.72170,53	0.27829,47	870,65	129,35	53
8	0.01744,94	0.55613,28	4.72192,36	0.27807,64	872,47	127,53	52
9	0.01748,60	0.55571,63	4.72214,18	0.27785,81	874,30	125,70	51
10	0.01752,26	0.55528,03	4.72235,98	0.27764,02	876,13	123,87	50
11	0.01755,92	0.55484,47	4.72257,76	0.27742,24	0.00877,96	4.99122,04	49
12	0.01759,59	0.55440,96	4.72279,52	0.27720,48	879,79	122,20	48
13	0.01763,26	0.55397,50	4.72301,25	0.27698,75	881,63	118,37	47
14	0.01766,94	0.55354,09	4.72323,95	0.27677,04	883,47	116,53	46
15	0.01770,62	0.55310,73	4.72344,63	0.27655,37	885,31	114,69	45
16	0.01774,31	0.55267,41	4.72366,29	0.27633,71	887,16	112,84	44
17	0.01777,99	0.55224,14	4.72387,93	0.27612,07	888,99	111,00	43
18	0.01781,69	0.55180,91	4.72409,54	0.27590,46	890,85	109,05	42
19	0.01785,38	0.55137,73	4.72431,13	0.27568,86	892,69	107,31	41
20	0.01789,08	0.55094,60	4.72452,70	0.27547,30	894,54	105,46	40
21	0.01792,79	0.55051,51	4.72474,24	0.27525,76	0.00896,39	4.99104,60	39
22	0.01796,49	0.55008,47	4.72495,76	0.27504,24	898,25	101,75	38
23	0.01800,21	0.54965,48	4.72517,26	0.27482,74	900,11	99,89	37
24	0.01803,92	0.54922,53	4.72538,73	0.27461,26	901,96	98,04	36
25	0.01807,64	0.54879,63	4.72560,18	0.27439,81	903,82	96,18	35
26	0.01811,37	0.54836,78	4.72581,61	0.27418,39	905,69	94,31	34
27	0.01815,10	0.54793,97	4.72603,01	0.27396,99	907,55	92,45	33
28	0.01818,83	0.54751,21	4.72624,39	0.27375,61	909,42	90,58	32
29	0.01822,56	0.54708,49	4.72645,75	0.27354,25	911,28	88,72	31
30	0.01826,30	0.54666,82	4.72667,09	0.27332,91	913,15	86,85	30
31	0.01830,05	0.54623,19	4.72688,40	0.27311,59	0.00916,03	4.99084,97	29
32	0.01833,80	0.54580,61	4.72709,69	0.27290,31	916,90	85,10	28
33	0.01837,55	0.54538,08	4.72730,96	0.27269,02	918,77	83,22	27
34	0.01841,30	0.54495,59	4.72752,20	0.27247,79	920,65	81,35	26
35	0.01845,06	0.54453,14	4.72773,43	0.27226,57	922,53	79,47	25
36	0.01848,83	0.54410,74	4.72794,63	0.27205,37	924,42	77,58	24
37	0.01852,60	0.54368,39	4.72815,80	0.27184,20	926,30	75,70	23
38	0.01856,37	0.54326,08	4.72836,96	0.27163,04	928,19	73,81	22
39	0.01860,14	0.54283,82	4.72858,09	0.27141,91	930,07	71,93	21
40	0.01863,92	0.54241,60	4.72879,20	0.27120,80	931,96	69,04	20
41	0.01867,71	0.54199,42	4.72900,29	0.27099,71	0.00933,85	4.99066,74	19
42	0.01871,50	0.54157,29	4.72921,35	0.27078,65	935,75	67,25	18
43	0.01875,29	0.54115,20	4.72942,40	0.27057,60	937,65	65,35	17
44	0.01879,09	0.54073,16	4.72962,43	0.27036,58	939,55	63,45	16
45	0.01882,89	0.54031,16	4.72982,42	0.27015,68	941,44	61,55	15
46	0.01886,69	0.53989,21	4.73002,39	0.26994,61	943,35	59,65	14
47	0.01890,50	0.53947,30	4.73022,35	0.26973,65	945,25	57,75	13
48	0.01894,31	0.53905,44	4.73042,28	0.26952,72	947,16	55,84	12
49	0.01898,13	0.53863,62	4.73062,19	0.26931,81	949,07	53,93	11
50	0.01901,95	0.53821,84	4.73082,08	0.26910,92	950,97	52,02	10
51	0.01905,77	0.53780,11	4.73102,94	0.26890,06	0.00952,88	4.99047,11	9
52	0.01909,60	0.53738,42	4.73123,79	0.26869,21	954,80	50,20	8
53	0.01913,43	0.53696,77	4.73145,61	0.26848,38	956,72	48,38	7
54	0.01917,27	0.53655,17	4.73172,41	0.26827,58	958,63	46,56	6
55	0.01921,11	0.53613,61	4.73193,19	0.26806,81	960,55	44,74	5
56	0.01924,95	0.53572,10	4.73213,93	0.26786,05	962,48	42,92	4
57	0.01928,80	0.53530,62	4.73234,69	0.26765,37	964,40	41,10	3
58	0.01932,65	0.53489,19	4.73255,40	0.26744,69	966,38	39,28	2
59	0.01936,51	0.53447,81	4.73276,04	0.26723,96	968,25	37,47	1
60	0.01940,37	0.53406,47	4.73296,76	0.26703,22	970,19	35,61	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Sines.	Half M	

M.	Secants.	Cosecants.	Half Sines.	Half Cosec.	Half Sec.	Half Cof.	M.
0	0.01940,37	0.53408,47	4.73286,76	0.26703,24	0.00970,19	4.99029,81	60
1	0.01944,83	0.53365,17	4.73317,41	0.26682,58	0.00972,12	4.99027,88	59
2	1948,10	53323,91	73338,04	26661,96	974,05	9025,195	58
3	1951,97	53281,70	73358,65	26641,35	975,98	9024,01	57
4	1955,85	53241,52	73379,24	26620,76	977,93	9022,07	56
5	1959,73	53200,40	73399,80	26600,20	979,86	9020,13	55
6	1963,61	53159,31	73420,34	26579,65	981,80	9018,19	54
7	1967,50	53118,27	73440,86	26559,14	983,75	9016,25	53
8	1971,40	53077,27	73461,36	26538,64	985,70	9014,30	52
9	1975,29	53036,31	73481,84	26518,16	987,65	9012,35	51
10	1979,19	52995,39	73502,30	26497,69	989,59	9010,40	50
11	0.01983,10	0.52954,52	4.73521,74	0.26477,26	0.00981,55	4.99008,45	49
12	1987,01	52913,09	73543,15	26456,85	993,51	9006,49	48
13	1990,92	52872,90	73563,55	26436,45	995,46	9004,54	47
14	1994,84	52832,15	73583,92	26416,07	997,42	9002,58	46
15	1998,76	52791,44	73604,28	26395,72	999,38	9000,62	45
16	2002,68	52750,78	73624,61	26375,39	1001,34	8998,66	44
17	2006,61	52710,15	73644,92	26355,07	1003,31	8996,69	43
18	2010,54	52669,57	73665,21	26334,79	1005,27	8994,73	42
19	2014,48	52629,03	73685,48	26314,52	1007,24	8992,76	41
20	2018,42	52588,54	73705,73	26294,27	1009,21	8990,79	40
21	0.02023,36	0.52548,08	4.73725,96	0.26274,04	0.01021,18	4.99882,82	39
22	2026,31	52507,66	73746,17	26253,83	1011,16	8986,84	38
23	2030,27	52467,29	73766,35	26233,64	1013,14	8984,86	37
24	2034,22	52426,96	73786,52	26213,48	1015,11	8982,89	36
25	2038,18	52386,66	73806,67	26193,33	1017,09	8980,91	35
26	2042,15	52346,41	73826,79	26173,21	1019,06	8978,92	34
27	2046,12	52306,20	73846,90	26153,10	1021,06	8976,94	33
28	2050,09	52266,04	73867,98	26133,02	1023,04	8974,95	32
29	2054,07	52225,91	73887,04	26112,95	1025,03	8972,96	31
30	2058,05	52185,82	73907,09	26092,91	1027,03	8970,97	30
31	0.02062,04	0.52145,77	4.73927,11	0.26072,88	0.01061,02	4.99698,98	29
32	2066,02	52105,77	73947,12	26052,88	1029,01	8968,99	28
33	2070,02	52065,80	73967,10	26032,90	1031,01	8966,99	27
34	2074,03	52025,88	73987,06	26012,94	1033,01	8964,99	26
35	2078,02	51985,99	74007,00	25993,99	1035,01	8962,99	25
36	2082,02	51946,15	74026,92	25973,08	1037,01	8960,99	24
37	2086,03	51906,34	74046,83	25953,17	1039,02	8958,98	23
38	2090,04	51866,58	74066,71	25933,29	1041,02	8956,98	22
39	2094,06	51826,85	74086,57	25913,43	1043,03	8954,97	21
40	2098,08	51787,17	74106,41	25893,58	1045,04	8952,96	20
41	0.02101,11	0.51747,51	4.74126,24	0.25873,76	0.01101,05	4.99498,93	19
42	2106,14	51707,92	74146,04	25853,96	1053,07	8946,93	18
43	2110,17	51668,35	74165,82	25834,17	1055,09	8944,91	17
44	2114,21	51628,83	74185,58	25814,42	1057,11	8942,89	16
45	2118,25	51589,34	74205,33	25794,67	1059,12	8940,87	15
46	2122,30	51549,90	74225,05	25774,95	1061,15	8938,85	14
47	2126,35	51510,49	74244,75	25755,25	1063,18	8936,82	13
48	2130,40	51471,12	74264,44	25735,66	1065,20	8934,80	12
49	2134,46	51431,80	74284,10	25715,90	1067,23	8932,77	11
50	2138,52	51392,51	74303,74	25696,25	1069,26	8930,74	10
51	0.02144,59	0.51353,26	4.74323,37	0.25676,63	0.01144,29	4.99212,70	9
52	2146,66	51314,05	74343,03	25657,03	1071,33	8926,67	8
53	2150,73	51274,88	74362,56	25637,44	1073,36	8924,63	7
54	2154,81	51235,74	74382,13	25617,87	1075,41	8922,59	6
55	2158,89	51196,65	74401,67	25598,33	1077,45	8920,55	5
56	2162,98	51157,60	74421,20	25578,80	1079,49	8918,51	4
57	2167,07	51118,58	74440,71	25559,29	1081,54	8916,46	3
58	2171,17	51079,60	74460,20	25539,80	1083,59	8914,41	2
59	2175,26	51040,66	74479,67	25520,33	1085,63	8912,37	1
60	2179,37	51001,76	74499,11	25500,88	1087,69	8910,31	0
M	Cosecants.	Secants.	Half Cof.	Half Sec.	Half Cosec.	Half Sines.	M

M	Secanta.	Cofecanta.	Half Sines.	Half Cofco.	Half Sec.	Half Cof.	M
0	0.0217937	0.5100176	74439.12	0.2550088	0.0108069	4.989031	60
1	0.0218347	0.5098290	74445.60	0.2548140	0.0109174	4.9890836	59
2	0.0218759	0.5096408	74452.08	0.2546204	0.0110279	4.9891360	58
3	0.0219170	0.5094529	74458.56	0.2544264	0.0111385	4.9891885	57
4	0.0219582	0.5092655	74465.04	0.2542328	0.0112491	4.9892409	56
5	0.0219994	0.5090784	74471.52	0.2540392	0.0113597	4.9892933	55
6	0.0220407	0.5088917	74478.00	0.2538458	0.0114704	4.9893457	54
7	0.0220820	0.5087054	74484.48	0.2536527	0.0115810	4.9893981	53
8	0.0221234	0.5085194	74490.96	0.2534597	0.0116916	4.9894505	52
9	0.0221647	0.5083339	74497.44	0.2532669	0.0118024	4.9895029	51
10	0.0222062	0.5081487	74503.92	0.2530744	0.0119131	4.9895553	50
11	0.0222477	0.5079639	74510.40	0.2528819	0.0120238	4.9896077	49
12	0.0222893	0.5077795	74516.88	0.2526898	0.0121346	4.9896601	48
13	0.0223307	0.5075954	74523.36	0.2524979	0.0122453	4.9897125	47
14	0.0223723	0.5074117	74529.84	0.2523061	0.0123562	4.9897649	46
15	0.0224140	0.5072284	74536.32	0.2521142	0.0124670	4.9898173	45
16	0.0224556	0.5070455	74542.80	0.2519222	0.0125778	4.9898697	44
17	0.0224974	0.5068630	74549.28	0.2517305	0.0126887	4.9899221	43
18	0.0225391	0.5066808	74555.76	0.2515384	0.0127995	4.9899745	42
19	0.0225809	0.5064990	74562.24	0.2513465	0.0129105	4.9900269	41
20	0.0226228	0.5063176	74568.72	0.2511548	0.0130214	4.9900793	40
21	0.0226646	0.5061365	74575.20	0.2509633	0.0131323	4.9901317	39
22	0.0227066	0.5059558	74581.68	0.2507719	0.0132433	4.9901841	38
23	0.0227485	0.5057755	74588.16	0.2505808	0.0133543	4.9902365	37
24	0.0227905	0.5055955	74594.64	0.2503897	0.0134653	4.9902889	36
25	0.0228326	0.5054160	74601.12	0.2501988	0.0135763	4.9903413	35
26	0.0228747	0.5052367	74607.60	0.2500080	0.0136873	4.9903937	34
27	0.0229168	0.5050579	74614.08	0.2498172	0.0137983	4.9904461	33
28	0.0229590	0.5048794	74620.56	0.2496267	0.0139093	4.9904985	32
29	0.0230012	0.5046991	74627.04	0.2494361	0.0140203	4.9905509	31
30	0.0230434	0.5045183	74633.52	0.2492458	0.0141313	4.9906033	30
31	0.0230857	0.5043384	74640.00	0.2490556	0.0142423	4.9906557	29
32	0.0231280	0.5041589	74646.48	0.2488656	0.0143533	4.9907081	28
33	0.0231704	0.5039792	74652.96	0.2486758	0.0144643	4.9907605	27
34	0.0232128	0.5037995	74659.44	0.2484861	0.0145753	4.9908129	26
35	0.0232553	0.5036198	74665.92	0.2482966	0.0146863	4.9908653	25
36	0.0232978	0.5034403	74672.40	0.2481072	0.0147973	4.9909177	24
37	0.0233403	0.5032608	74678.88	0.2479179	0.0149083	4.9909701	23
38	0.0233829	0.5030814	74685.36	0.2477286	0.0150193	4.9910225	22
39	0.0234255	0.5029021	74691.84	0.2475393	0.0151303	4.9910749	21
40	0.0234682	0.5027226	74698.32	0.2473501	0.0152413	4.9911273	20
41	0.0235109	0.5025433	74704.80	0.2471609	0.0153523	4.9911797	19
42	0.0235536	0.5023640	74711.28	0.2469718	0.0154633	4.9912321	18
43	0.0235964	0.5021848	74717.76	0.2467828	0.0155743	4.9912845	17
44	0.0236392	0.5020056	74724.24	0.2465938	0.0156853	4.9913369	16
45	0.0236821	0.5018265	74730.72	0.2464048	0.0157963	4.9913893	15
46	0.0237250	0.5016474	74737.20	0.2462158	0.0159073	4.9914417	14
47	0.0237679	0.5014683	74743.68	0.2460268	0.0160183	4.9914941	13
48	0.0238109	0.5012892	74750.16	0.2458378	0.0161293	4.9915465	12
49	0.0238539	0.5011101	74756.64	0.2456488	0.0162403	4.9915989	11
50	0.0238970	0.5009311	74763.12	0.2454598	0.0163513	4.9916513	10
51	0.0239401	0.5007521	74769.60	0.2452708	0.0164623	4.9917037	9
52	0.0239833	0.5005731	74776.08	0.2450818	0.0165733	4.9917561	8
53	0.0240264	0.5003941	74782.56	0.2448928	0.0166843	4.9918085	7
54	0.0240697	0.5002151	74789.04	0.2447038	0.0167953	4.9918609	6
55	0.0241130	0.5000361	74795.52	0.2445148	0.0169063	4.9919133	5
56	0.0241563	0.4998571	74802.00	0.2443258	0.0170173	4.9919657	4
57	0.0241996	0.4996781	74808.48	0.2441368	0.0171283	4.9920181	3
58	0.0242430	0.4994991	74814.96	0.2439478	0.0172393	4.9920705	2
59	0.0242865	0.4993201	74821.44	0.2437588	0.0173503	4.9921229	1
60	0.0243300	0.4991411	74827.92	0.2435698	0.0174613	4.9921753	0
M	Cofecanta.	Secanta.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

M	S. cants.	Co. cants.	Half Sines.	Half Cof.	Half Sec.	Half Cof.	M
0	0.02432.99	0.18735.81	4.75632.09	0.14357.91	0.01161.60	4.68989.50	60
1	0.02437.39	0.18699.14	4.75630.43	0.14349.57	0.01161.67	4.68981.32	59
2	0.02441.70	0.18662.50	4.75628.75	0.14341.25	0.01161.85	4.68973.15	58
3	0.02446.06	0.18625.90	4.75627.05	0.14332.95	0.01162.03	4.68964.97	57
4	0.02450.43	0.18589.38	4.75625.33	0.14324.66	0.01162.22	4.68956.78	56
5	0.02454.79	0.18552.79	4.75623.60	0.14316.40	0.01162.40	4.68948.60	55
6	0.02459.17	0.18516.29	4.75621.85	0.14308.15	0.01162.59	4.68940.41	54
7	0.02463.54	0.18479.83	4.75620.08	0.14300.92	0.01162.77	4.68932.23	53
8	0.02467.92	0.18443.40	4.75618.30	0.14292.70	0.01162.96	4.68924.05	52
9	0.02472.31	0.18407.00	4.75616.50	0.14284.50	0.01163.16	4.68915.84	51
10	0.02476.70	0.18370.64	4.75614.68	0.14276.32	0.01163.35	4.68907.65	50
11	0.02481.09	0.18334.31	4.75612.84	0.14268.15	0.01163.54	4.68899.45	49
12	0.02485.49	0.18298.02	4.75611.00	0.14259.91	0.01163.73	4.68891.25	48
13	0.02489.89	0.18261.76	4.75609.12	0.14251.68	0.01163.95	4.68883.05	47
14	0.02494.30	0.18225.53	4.75607.23	0.14243.47	0.01164.15	4.68874.85	46
15	0.02498.71	0.18189.34	4.75605.33	0.14235.27	0.01164.35	4.68866.64	45
16	0.02503.12	0.18153.18	4.75603.41	0.14227.09	0.01164.56	4.68858.44	44
17	0.02507.54	0.18117.05	4.75601.47	0.14218.92	0.01164.77	4.68850.23	43
18	0.02511.96	0.18080.96	4.75599.52	0.14210.76	0.01164.98	4.68842.02	42
19	0.02516.39	0.18044.90	4.75597.55	0.14202.61	0.01165.19	4.68833.81	41
20	0.02520.83	0.18008.88	4.75595.56	0.14194.44	0.01165.41	4.68825.59	40
21	0.02525.25	0.17972.89	4.75593.55	0.14186.25	0.01165.63	4.68817.37	39
22	0.02529.69	0.17936.93	4.75591.53	0.14178.06	0.01165.85	4.68809.15	38
23	0.02534.13	0.17901.01	4.75589.49	0.14169.85	0.01166.07	4.68800.93	37
24	0.02538.58	0.17865.12	4.75587.44	0.14161.66	0.01166.29	4.68792.71	36
25	0.02543.03	0.17829.26	4.75585.37	0.14153.43	0.01166.52	4.68784.48	35
26	0.02547.48	0.17793.44	4.75583.28	0.14145.22	0.01166.74	4.68776.26	34
27	0.02551.94	0.17757.65	4.75581.17	0.14137.03	0.01166.97	4.68768.03	33
28	0.02556.41	0.17721.89	4.75579.05	0.14128.81	0.01167.21	4.68759.79	32
29	0.02560.87	0.17686.17	4.75576.91	0.14120.59	0.01167.44	4.68751.56	31
30	0.02565.34	0.17650.47	4.75574.76	0.14112.34	0.01167.67	4.68743.33	30
31	0.02569.82	0.17614.82	4.75572.59	0.14104.11	0.01167.91	4.68735.09	29
32	0.02574.30	0.17579.19	4.75570.41	0.14095.89	0.01168.15	4.68726.85	28
33	0.02578.78	0.17543.60	4.75568.20	0.14087.68	0.01168.39	4.68718.61	27
34	0.02583.27	0.17508.04	4.75565.98	0.14079.42	0.01168.63	4.68710.36	26
35	0.02587.76	0.17472.51	4.75563.74	0.14071.17	0.01168.88	4.68702.11	25
36	0.02592.26	0.17437.02	4.75561.49	0.14062.91	0.01169.13	4.68693.87	24
37	0.02596.76	0.17401.56	4.75559.22	0.14054.66	0.01169.38	4.68685.62	23
38	0.02601.27	0.17366.13	4.75556.93	0.14046.42	0.01169.64	4.68677.36	22
39	0.02605.78	0.17330.73	4.75554.63	0.14038.17	0.01169.89	4.68669.11	21
40	0.02610.29	0.17295.37	4.75552.31	0.14029.91	0.01170.15	4.68660.85	20
41	0.02614.81	0.17260.03	4.75549.98	0.14021.66	0.01170.41	4.68652.59	19
42	0.02619.33	0.17224.74	4.75547.63	0.14013.42	0.01170.66	4.68644.33	18
43	0.02623.85	0.17189.47	4.75545.26	0.14005.19	0.01170.93	4.68636.07	17
44	0.02628.38	0.17154.23	4.75542.88	0.13996.95	0.01171.19	4.68627.81	16
45	0.02632.91	0.17119.03	4.75540.48	0.13988.72	0.01171.45	4.68619.54	15
46	0.02637.45	0.17083.86	4.75538.02	0.13980.48	0.01171.72	4.68611.27	14
47	0.02641.99	0.17048.72	4.75535.54	0.13972.24	0.01171.99	4.68603.00	13
48	0.02646.54	0.17013.62	4.75533.05	0.13964.01	0.01172.27	4.68594.73	12
49	0.02651.09	0.16978.54	4.75530.54	0.13955.77	0.01172.55	4.68586.45	11
50	0.02655.65	0.16943.50	4.75528.05	0.13947.53	0.01172.83	4.68578.17	10
51	0.02660.20	0.16908.49	4.75525.55	0.13939.28	0.01173.10	4.68569.90	9
52	0.02664.77	0.16873.51	4.75523.04	0.13931.03	0.01173.38	4.68561.61	8
53	0.02669.33	0.16838.57	4.75520.51	0.13922.78	0.01173.66	4.68553.33	7
54	0.02673.90	0.16803.65	4.75517.98	0.13914.53	0.01173.95	4.68545.05	6
55	0.02678.48	0.16768.77	4.75515.43	0.13906.28	0.01174.24	4.68536.76	5
56	0.02683.06	0.16733.92	4.75512.88	0.13898.03	0.01174.53	4.68528.47	4
57	0.02687.64	0.16699.10	4.75510.32	0.13889.78	0.01174.82	4.68520.18	3
58	0.02692.23	0.16664.31	4.75507.75	0.13881.53	0.01175.12	4.68511.88	2
59	0.02696.82	0.16629.56	4.75505.18	0.13873.28	0.01175.41	4.68503.59	1
60	0.02701.42	0.16595.83	4.75502.60	0.13865.03	0.01175.71	4.68495.29	0
M	Cofcants.	Secants.	Half Cof.	Half Sec.	Half Cof.	Half Sines.	M

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
1	0.0071148	0.46694.83	4.76708158	0.82297.42	0.01350.71	4.98659.29	60
2	0.007266.02	0.46560.24	4.76549.93	0.82280.07	0.01355.04	4.98646.99	59
3	0.007420.64	0.46426.18	4.76392.36	0.82262.74	0.01359.34	4.98634.69	58
4	0.007578.23	0.46290.85	4.76234.57	0.82245.43	0.01363.62	4.98622.38	57
5	0.007739.84	0.46156.25	4.76077.18	0.82228.13	0.01367.92	4.98610.08	56
6	0.007904.46	0.46021.68	4.75920.16	0.82210.84	0.01372.23	4.98597.77	55
7	0.008072.08	0.45887.12	4.75763.43	0.82193.57	0.01376.54	4.98585.46	54
8	0.008243.71	0.45752.63	4.75606.68	0.82176.32	0.01380.85	4.98573.14	53
9	0.008418.34	0.45618.16	4.75450.92	0.82159.08	0.01385.17	4.98560.83	52
10	0.008596.97	0.45483.77	4.75295.14	0.82141.85	0.01389.49	4.98548.52	51
11	0.008778.61	0.45349.35	4.75139.35	0.82124.65	0.01393.81	4.98536.19	50
12	0.008963.25	0.45214.92	4.74983.54	0.82107.46	0.01398.13	4.98523.87	49
13	0.009150.90	0.45080.57	4.74827.71	0.82090.29	0.01402.45	4.98511.55	48
14	0.009340.58	0.44946.25	4.74671.87	0.82073.12	0.01406.77	4.98499.22	47
15	0.009532.29	0.44811.96	4.74516.02	0.82055.98	0.01411.10	4.98486.90	46
16	0.009726.06	0.44677.70	4.74360.15	0.82038.85	0.01415.43	4.98474.57	45
17	0.009921.89	0.44543.47	4.74204.26	0.82021.73	0.01419.76	4.98462.24	44
18	0.010119.78	0.44409.27	4.74048.36	0.82004.64	0.01424.09	4.98449.91	43
19	0.010320.74	0.44275.11	4.73892.44	0.81987.56	0.01428.43	4.98437.57	42
20	0.010523.78	0.44140.97	4.73736.52	0.81970.48	0.01432.76	4.98425.24	41
21	0.010728.91	0.44006.86	4.73580.57	0.81953.43	0.01437.11	4.98412.91	40
22	0.010936.14	0.43872.79	4.73424.60	0.81936.39	0.01441.45	4.98400.58	39
23	0.011145.58	0.43738.74	4.73268.63	0.81919.37	0.01445.79	4.98388.25	38
24	0.011357.23	0.43604.72	4.73112.63	0.81902.37	0.01450.14	4.98375.92	37
25	0.011571.10	0.43470.74	4.72956.63	0.81885.37	0.01454.48	4.98363.59	36
26	0.011787.20	0.43336.79	4.72800.60	0.81868.39	0.01458.84	4.98351.26	35
27	0.012005.54	0.43202.87	4.72644.55	0.81851.44	0.01463.19	4.98338.93	34
28	0.012226.23	0.43068.97	4.72488.51	0.81834.49	0.01467.55	4.98326.60	33
29	0.012449.38	0.42935.11	4.72332.44	0.81817.56	0.01471.90	4.98314.27	32
30	0.012674.99	0.42801.27	4.72176.36	0.81800.64	0.01476.26	4.98301.94	31
31	0.012903.17	0.42667.47	4.72020.26	0.81783.74	0.01480.61	4.98289.61	30
32	0.013133.92	0.42533.70	4.71864.15	0.81766.85	0.01484.98	4.98277.28	29
33	0.013367.25	0.42400.05	4.71708.02	0.81749.96	0.01489.35	4.98264.95	28
34	0.013603.18	0.42266.42	4.71551.88	0.81733.12	0.01493.71	4.98252.62	27
35	0.013841.72	0.42132.85	4.71395.73	0.81716.28	0.01498.08	4.98240.29	26
36	0.014082.98	0.42000.35	4.71239.56	0.81699.45	0.01502.45	4.98227.96	25
37	0.014326.98	0.41867.92	4.71083.36	0.81682.64	0.01506.83	4.98215.63	24
38	0.014573.74	0.41735.68	4.70927.16	0.81665.84	0.01511.20	4.98203.30	23
39	0.014823.28	0.41603.51	4.70770.94	0.81649.05	0.01515.58	4.98190.97	22
40	0.015075.61	0.41471.42	4.70614.71	0.81632.29	0.01519.96	4.98178.64	21
41	0.015330.75	0.41339.40	4.70458.46	0.81615.54	0.01524.34	4.98166.31	20
42	0.015588.71	0.41207.50	4.70302.20	0.81598.80	0.01528.72	4.98153.98	19
43	0.015849.50	0.41075.72	4.70145.93	0.81582.08	0.01533.11	4.98141.65	18
44	0.016113.14	0.40944.15	4.70000.00	0.81565.36	0.01537.51	4.98129.32	17
45	0.016379.64	0.40812.78	4.69854.03	0.81548.67	0.01541.91	4.98116.99	16
46	0.016649.02	0.40681.60	4.69708.01	0.81531.99	0.01546.32	4.98104.66	15
47	0.016921.28	0.40550.65	4.69561.97	0.81515.33	0.01550.73	4.98092.33	14
48	0.017196.54	0.40420.92	4.69415.92	0.81498.68	0.01555.14	4.98079.99	13
49	0.017474.81	0.40291.40	4.69270.00	0.81482.04	0.01559.56	4.98067.66	12
50	0.017755.10	0.40162.08	4.69124.03	0.81465.42	0.01563.97	4.98055.33	11
51	0.018038.42	0.40032.95	4.68978.01	0.81448.81	0.01568.39	4.98042.99	10
52	0.018324.78	0.39904.10	4.68831.97	0.81432.22	0.01572.81	4.98030.66	9
53	0.018614.19	0.39775.52	4.68685.92	0.81415.65	0.01577.23	4.98018.33	8
54	0.018906.66	0.39647.22	4.68540.00	0.81399.09	0.01581.66	4.98005.99	7
55	0.019202.20	0.39519.20	4.68394.03	0.81382.56	0.01586.09	4.97993.66	6
56	0.019500.82	0.39391.55	4.68248.01	0.81366.04	0.01590.52	4.97981.33	5
57	0.019801.54	0.39264.25	4.68102.00	0.81349.54	0.01594.95	4.97968.99	4
58	0.020104.37	0.39137.30	4.67956.03	0.81333.06	0.01599.38	4.97956.66	3
59	0.020409.32	0.39010.70	4.67810.00	0.81316.60	0.01603.81	4.97944.33	2
60	0.020716.39	0.38884.55	4.67664.03	0.81300.16	0.01608.24	4.97931.99	1
M	Cofecants.	Secants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.0984.89	0.44567.08	4.77716.46	0.22283.54	0.01492.42	4.98507.58	60
1	0.0989.68	0.44534.19	4.77732.90	0.22267.09	0.01494.84	4.98505.16	59
2	0.0994.53	0.44501.32	4.77749.34	0.22250.66	0.01497.26	4.98502.78	58
3	0.0999.39	0.44468.48	4.77765.76	0.22234.24	0.01499.69	4.98500.30	57
4	0.0004.26	0.44435.67	4.77782.16	0.22217.84	0.01502.13	4.98497.87	56
5	0.0009.13	0.44402.89	4.77798.55	0.22201.44	0.01504.56	4.98495.43	55
6	0.0014.00	0.44370.13	4.77814.93	0.22185.07	0.01507.00	4.98493.00	54
7	0.0018.88	0.44337.41	4.77831.29	0.22168.71	0.01509.44	4.98490.56	53
8	0.0023.76	0.44304.71	4.77847.64	0.22152.26	0.01511.88	4.98488.12	52
9	0.0028.64	0.44272.04	4.77863.98	0.22136.02	0.01514.32	4.98485.68	51
10	0.0033.53	0.44239.40	4.77880.30	0.22119.70	0.01516.77	4.98483.23	50
11	0.0038.42	0.44206.79	4.77896.60	0.22103.39	0.01519.21	4.98480.79	49
12	0.0043.32	0.44174.21	4.77912.89	0.22087.11	0.01521.66	4.98478.34	48
13	0.0048.23	0.44141.65	4.77929.17	0.22070.83	0.01524.12	4.98475.88	47
14	0.0053.13	0.44109.12	4.77945.44	0.22054.56	0.01526.56	4.98473.43	46
15	0.0058.04	0.44076.62	4.77961.69	0.22038.31	0.01529.02	4.98470.98	45
16	0.0062.96	0.44044.15	4.77977.92	0.22022.07	0.01531.48	4.98468.52	44
17	0.0067.88	0.44011.71	4.77994.14	0.22005.86	0.01533.94	4.98466.06	43
18	0.0072.80	0.43979.29	4.78010.35	0.21989.64	0.01536.40	4.98463.60	42
19	0.0077.73	0.43946.90	4.78026.55	0.21973.45	0.01538.86	4.98461.13	41
20	0.0082.66	0.43914.54	4.78042.73	0.21957.27	0.01541.33	4.98458.67	40
21	0.0087.59	0.43882.21	4.78058.89	0.21941.11	0.01543.79	4.98456.20	39
22	0.0092.52	0.43849.90	4.78075.05	0.21924.95	0.01546.27	4.98453.73	38
23	0.0097.44	0.43817.63	4.78091.18	0.21908.82	0.01548.74	4.98451.26	37
24	0.0102.37	0.43785.38	4.78107.31	0.21892.69	0.01551.22	4.98448.78	36
25	0.0107.30	0.43753.15	4.78123.42	0.21876.57	0.01553.69	4.98446.31	35
26	0.0112.24	0.43720.96	4.78139.53	0.21860.48	0.01556.17	4.98443.82	34
27	0.0117.17	0.43688.79	4.78155.60	0.21844.39	0.01558.65	4.98441.35	33
28	0.0122.11	0.43656.65	4.78171.67	0.21828.33	0.01561.14	4.98438.86	32
29	0.0127.04	0.43624.54	4.78187.73	0.21812.27	0.01563.63	4.98436.38	31
30	0.0131.97	0.43592.46	4.78203.77	0.21796.23	0.01566.11	4.98433.89	30
31	0.0136.90	0.43560.40	4.78219.80	0.21780.20	0.01568.59	4.98431.40	29
32	0.0141.83	0.43528.37	4.78235.81	0.21764.19	0.01571.09	4.98428.91	28
33	0.0146.76	0.43496.37	4.78251.81	0.21748.19	0.01573.58	4.98426.42	27
34	0.0151.69	0.43464.39	4.78267.80	0.21732.20	0.01576.08	4.98423.93	26
35	0.0156.62	0.43432.44	4.78283.78	0.21716.22	0.01578.57	4.98421.43	25
36	0.0161.55	0.43400.52	4.78299.74	0.21700.26	0.01581.07	4.98418.93	24
37	0.0166.48	0.43368.63	4.78315.68	0.21684.32	0.01583.58	4.98416.43	23
38	0.0171.41	0.43336.76	4.78331.62	0.21668.38	0.01586.08	4.98413.93	22
39	0.0176.34	0.43304.92	4.78347.54	0.21652.46	0.01588.58	4.98411.41	21
40	0.0181.27	0.43273.11	4.78363.44	0.21636.56	0.01591.09	4.98408.90	20
41	0.0186.20	0.43241.32	4.78379.34	0.21620.66	0.01593.61	4.98406.39	19
42	0.0191.13	0.43209.56	4.78395.22	0.21604.78	0.01596.12	4.98403.88	18
43	0.0196.06	0.43177.83	4.78411.08	0.21588.92	0.01598.63	4.98401.37	17
44	0.0200.99	0.43146.13	4.78426.93	0.21573.07	0.01601.13	4.98398.85	16
45	0.0205.92	0.43114.45	4.78442.77	0.21557.22	0.01603.66	4.98396.33	15
46	0.0210.85	0.43082.79	4.78458.60	0.21541.39	0.01606.18	4.98393.81	14
47	0.0215.78	0.43051.17	4.78474.41	0.21525.59	0.01608.71	4.98391.29	13
48	0.0220.71	0.43019.57	4.78490.21	0.21509.79	0.01611.24	4.98388.76	12
49	0.0225.64	0.42988.00	4.78506.00	0.21494.00	0.01613.77	4.98386.23	11
50	0.0230.57	0.42956.45	4.78521.77	0.21478.23	0.01616.29	4.98383.70	10
51	0.0235.50	0.42924.94	4.78537.53	0.21462.47	0.01618.83	4.98381.17	9
52	0.0240.43	0.42893.44	4.78553.28	0.21446.72	0.01621.36	4.98378.64	8
53	0.0245.36	0.42861.98	4.78569.01	0.21430.99	0.01623.89	4.98376.10	7
54	0.0250.29	0.42830.54	4.78584.78	0.21415.27	0.01626.44	4.98373.56	6
55	0.0255.22	0.42799.13	4.78600.48	0.21399.57	0.01628.98	4.98371.02	5
56	0.0260.15	0.42767.74	4.78616.13	0.21383.87	0.01631.52	4.98368.48	4
57	0.0265.08	0.42736.38	4.78631.81	0.21368.19	0.01634.06	4.98365.94	3
58	0.0270.01	0.42705.05	4.78647.47	0.21352.53	0.01636.61	4.98363.39	2
59	0.0274.94	0.42673.74	4.78663.13	0.21336.87	0.01639.15	4.98360.84	1
60	0.0279.87	0.42642.46	4.78678.77	0.21321.23	0.01641.71	4.98358.29	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.03283,41	0.42612,46	4.78678,77	0.21321,23	0.01641,71	4.98358,29	60
1	0.03288,52	0.42611,20	4.78694,40	0.21315,60	0.01641,26	4.98355,74	59
2	3393,63	42579,97	78712,01	21289,99	1046,81	8353,18	58
3	3398,75	42548,77	78725,61	21274,38	1049,38	8350,62	57
4	3303,86	42517,60	78741,20	21258,80	1051,93	8348,07	56
5	3308,99	42486,44	78756,78	21243,22	1054,49	8345,50	55
6	3314,12	42455,32	78772,34	21227,66	1057,06	8342,94	54
7	3319,25	42424,22	78787,89	21212,11	1059,63	8340,37	53
8	3324,38	42393,15	78803,42	21196,58	1062,19	8337,81	52
9	3329,52	42362,10	78818,95	21181,05	1064,76	8335,24	51
10	3334,67	42331,08	78834,46	21165,54	1067,33	8332,66	50
11	0.03339,81	0.42300,09	4.78849,95	0.21160,05	0.01669,91	4.98330,09	49
12	3334,97	42269,12	78865,44	21144,66	1072,49	8327,51	48
13	3335,13	42238,17	78880,91	21119,09	1075,07	8324,93	47
14	3335,29	42207,25	78896,37	21103,62	1077,65	8322,35	46
15	3335,46	42176,36	78911,82	21088,18	1080,23	8319,77	45
16	3335,63	42145,50	78927,25	21072,75	1082,81	8317,18	44
17	3335,80	42114,65	78942,67	21057,33	1085,40	8314,60	43
18	3335,98	42083,84	78958,08	21041,92	1087,99	8312,01	42
19	3336,16	42053,05	78973,47	21026,53	1090,58	8309,42	41
20	3336,35	42022,28	78988,86	21011,14	1093,18	8306,82	40
21	0.03391,54	0.41991,55	4.79004,23	0.20995,78	0.01695,77	4.98304,23	39
22	3336,74	41960,83	79019,58	20980,42	1095,37	8301,62	38
23	3401,94	41930,14	79035,93	20965,07	1097,97	8299,03	37
24	3407,15	41899,48	79052,26	20949,74	1099,57	8296,42	36
25	3412,36	41868,84	79068,58	20934,42	1102,18	8293,82	35
26	3417,57	41838,23	79085,88	20919,11	1104,79	8291,21	34
27	3422,79	41807,64	79102,18	20903,82	1111,40	8288,60	33
28	3428,01	41777,08	79118,46	20888,52	1114,01	8285,99	32
29	3433,23	41746,55	79134,77	20873,23	1116,63	8283,38	31
30	3438,47	41716,03	79151,08	20858,02	1119,24	8280,76	30
31	0.03443,70	0.41685,55	4.79157,22	0.20843,77	0.01721,85	4.98277,15	29
32	3448,94	41655,09	79172,45	20827,55	1124,47	8275,53	28
33	3454,16	41624,65	79187,67	20812,32	1127,09	8272,91	27
34	3459,43	41594,24	79202,88	20797,12	1129,72	8270,28	26
35	3464,68	41563,85	79218,07	20781,93	1132,34	8267,66	25
36	3469,94	41533,49	79233,25	20766,75	1134,97	8265,03	24
37	3475,20	41503,15	79248,42	20751,57	1137,60	8262,40	23
38	3480,47	41472,84	79263,58	20736,42	1140,24	8259,76	22
39	3485,74	41442,55	79278,72	20721,28	1142,87	8257,13	21
40	3491,01	41412,29	79293,85	20706,15	1145,51	8254,49	20
41	0.03496,29	0.41382,05	4.79308,97	0.20691,13	0.01748,15	4.98251,85	19
42	3501,57	41351,84	79324,08	20675,92	1150,78	8249,21	18
43	3506,86	41321,65	79339,17	20660,83	1153,43	8246,57	17
44	3512,15	41291,49	79354,25	20645,74	1156,08	8243,92	16
45	3517,44	41261,35	79369,32	20630,67	1158,72	8241,28	15
46	3522,74	41231,24	79384,38	20615,62	1161,37	8238,63	14
47	3528,05	41201,15	79399,42	20600,58	1164,03	8235,97	13
48	3533,35	41171,08	79414,46	20585,54	1166,67	8233,32	12
49	3538,67	41141,02	79429,48	20570,52	1169,33	8230,66	11
50	3543,98	41111,03	79444,48	20555,52	1171,99	8228,01	10
51	0.03549,31	0.41081,03	4.79459,48	0.20540,52	0.01774,65	4.98225,34	9
52	3554,63	41051,07	79474,96	20525,04	1177,32	8222,68	8
53	3559,96	41021,12	79489,44	20510,56	1179,98	8220,02	7
54	3565,30	40991,20	79504,40	20495,60	1182,65	8217,35	6
55	3570,63	40961,31	79519,34	20480,65	1185,32	8214,68	5
56	3575,98	40931,44	79534,28	20465,72	1187,99	8212,01	4
57	3581,32	40901,59	79549,40	20450,80	1190,66	8209,34	3
58	3586,68	40871,77	79564,11	20435,88	1193,34	8206,66	2
59	3592,03	40841,97	79579,01	20420,98	1196,02	8203,98	1
60	3597,39	40812,20	79593,90	20406,10	1198,69	8201,30	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.03397.39	4.0082.20	4.76498.94	0.30406.10	0.01798.69	4.00801.39	90
1	0.03398.76	4.0082.45	4.76503.77	0.30407.33	0.01801.32	4.00802.51	89
2	365.13	40752.73	79643.64	0.0076.37	1804.07	3899.93	88
3	3613.50	40723.04	79648.49	0.0081.51	1808.75	3893.25	87
4	3618.88	40693.94	79653.33	0.0086.67	1813.44	3886.56	86
5	3624.26	40663.69	79658.15	0.0091.85	1818.13	3879.87	85
6	3629.64	40634.06	79662.97	0.0097.03	1822.82	3873.18	84
7	3635.02	40604.45	79667.77	0.0102.23	1827.52	3866.48	83
8	3640.43	40574.84	79672.59	0.0107.44	1832.22	3859.79	82
9	3645.83	40545.31	79677.34	0.0112.66	1836.93	3853.09	81
10	3651.23	40515.79	79682.11	0.0117.89	1841.63	3846.39	80
11	0.03399.61	4.0082.67	4.79716.86	0.30513.14	0.01802.32	4.00803.68	79
12	3656.62	40486.78	79717.61	0.0123.39	1846.33	3839.69	78
13	3667.47	40457.35	79726.32	0.0128.66	1851.03	3832.99	77
14	3671.89	40427.88	79735.06	0.0133.94	1855.74	3826.29	76
15	3678.33	40398.45	79743.77	0.0139.23	1860.44	3819.59	75
16	3683.75	40369.07	79752.45	0.0144.53	1865.15	3812.89	74
17	3689.18	40339.76	79761.15	0.0150.85	1869.85	3806.19	73
18	3694.61	40310.35	79769.88	0.0156.18	1874.56	3799.49	72
19	3700.06	40281.02	79778.48	0.0161.51	1879.26	3792.79	71
20	3705.41	40251.78	79786.13	0.0166.87	1883.97	3786.09	70
21	0.03710.96	4.0090.46	4.79969.77	0.30606.23	0.02255.42	4.00814.53	69
22	3716.22	40163.21	79978.39	0.0168.61	1888.67	3779.39	68
23	3721.88	40133.98	79987.01	0.0173.95	1893.38	3772.69	67
24	3727.34	40104.77	79995.61	0.0179.38	1898.07	3765.99	66
25	3732.81	40075.59	79998.20	0.0184.79	1902.78	3759.29	65
26	3738.28	40046.43	79997.78	0.0190.22	1907.48	3752.59	64
27	3743.76	40017.30	79992.35	0.0195.65	1912.18	3745.89	63
28	3749.24	39988.19	79980.90	0.0201.10	1916.88	3739.19	62
29	3754.75	39959.10	79962.45	0.0206.53	1921.57	3732.49	61
30	3760.22	39930.03	79943.98	0.0211.98	1926.27	3725.79	60
31	0.03720.73	4.0090.99	4.80195.65	0.30658.86	0.02258.86	4.00817.14	59
32	3765.12	39907.97	79934.01	0.0217.39	1930.97	3719.09	58
33	3770.74	39878.97	79922.51	0.0222.81	1935.67	3712.39	57
34	3776.25	39849.00	79909.00	0.0228.22	1940.37	3705.69	56
35	3781.74	39819.05	79893.47	0.0233.65	1945.07	3698.99	55
36	3787.26	39789.12	79876.94	0.0239.06	1949.77	3692.29	54
37	3792.78	39759.22	79859.40	0.0244.48	1954.47	3685.59	53
38	3798.31	39729.34	79841.85	0.0249.91	1959.17	3678.89	52
39	3803.84	39699.48	79823.29	0.0255.34	1963.87	3672.19	51
40	3809.37	39669.64	79804.73	0.0260.78	1968.57	3665.49	50
41	0.03730.91	4.0091.83	4.80194.08	0.30685.91	0.02316.47	4.00820.54	49
42	3815.15	39639.84	79786.23	0.0266.23	1973.27	3658.79	48
43	3820.66	39609.97	79767.71	0.0271.66	1977.97	3652.09	47
44	3826.17	39580.12	79748.19	0.0277.09	1982.67	3645.39	46
45	3831.68	39550.28	79728.67	0.0282.52	1987.37	3638.69	45
46	3837.19	39520.45	79709.15	0.0287.95	1992.07	3631.99	44
47	3842.70	39490.63	79689.63	0.0293.38	1996.77	3625.29	43
48	3848.21	39460.82	79670.11	0.0298.81	2001.47	3618.59	42
49	3853.72	39431.02	79650.59	0.0304.24	2006.17	3611.89	41
50	3859.23	39401.23	79631.07	0.0309.67	2010.87	3605.19	40
51	0.03740.54	4.0092.49	4.80387.63	0.30681.47	0.02393.27	4.00823.73	39
52	3864.74	39371.38	79611.55	0.0315.10	2015.57	3598.49	38
53	3870.25	39341.57	79592.03	0.0320.53	2020.27	3591.79	37
54	3875.76	39311.78	79572.51	0.0325.96	2024.97	3585.09	36
55	3881.27	39281.99	79553.00	0.0331.39	2029.67	3578.39	35
56	3886.78	39252.21	79533.48	0.0336.82	2034.37	3571.69	34
57	3892.29	39222.44	79513.96	0.0342.25	2039.07	3564.99	33
58	3897.80	39192.67	79494.44	0.0347.68	2043.77	3558.29	32
59	3903.31	39162.91	79474.92	0.0353.11	2048.47	3551.59	31
60	3908.82	39133.16	79455.40	0.0358.54	2053.17	3544.89	30
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.39926,98	0.39068,67	4.30565,66	0.19534,14	0.01963,49	4.98036,51	60
1	0.39932,61	0.39040,31	4.30479,84	0.19520,15	0.01966,31	4.98033,69	59
2	39938,24	39031,97	80494,01	19506,99	1969,12	8030,88	58
3	39943,88	38983,63	80508,17	19591,83	1971,94	8028,06	57
4	39949,52	38955,35	80522,32	19477,67	1974,76	8025,24	56
5	39955,16	38927,07	80536,46	19563,53	1977,58	8022,42	55
6	39960,81	38898,82	80550,59	19449,41	1980,41	8019,59	54
7	39966,46	38870,59	80564,70	19435,29	1983,23	8016,77	53
8	39972,12	38842,38	80578,81	19521,19	1986,06	8013,94	52
9	39977,78	38814,20	80592,90	19407,10	1988,89	8011,11	51
10	39983,45	38786,03	80606,98	19393,02	1691,72	8008,27	50
11	0.39989,12	0.38757,89	4.30621,05	0.19378,94	0.01994,56	4.98005,44	49
12	39994,80	38729,77	80635,11	19364,88	1997,40	8002,60	48
13	40000,48	38701,67	80649,16	19350,84	2000,24	7999,76	47
14	40006,16	38673,59	80663,20	19336,79	2003,08	7996,92	46
15	4011,85	38645,54	80677,23	19322,77	2005,93	7994,07	45
16	4017,54	38617,50	80691,25	19308,75	2008,77	7991,23	44
17	4023,24	38589,49	80705,25	19294,75	2011,62	7988,38	43
18	4028,94	38561,50	80719,25	19280,75	2014,47	7985,53	42
19	4034,65	38533,53	80733,23	19266,77	2017,33	7982,67	41
20	4040,36	38505,59	80747,20	19252,80	2020,18	7979,82	40
21	0.4046,07	0.38477,66	4.30761,17	0.19238,83	0.02923,04	4.97976,96	39
22	4051,79	38449,76	80775,12	19224,88	2025,89	7974,10	38
23	4057,52	38421,88	80789,06	19210,94	2028,76	7971,24	37
24	4063,25	38394,01	80802,99	19197,01	2031,63	7968,37	36
25	4068,98	38366,18	80816,91	19183,09	2034,49	7965,51	35
26	4074,72	38338,36	80830,82	19169,18	2037,36	7962,64	34
27	4080,46	38310,56	80844,72	19155,28	2040,23	7959,87	33
28	4086,20	38282,79	80858,70	19141,29	2043,10	7956,90	32
29	4091,95	38255,04	80872,48	19127,52	2045,98	7954,02	31
30	4097,71	38227,30	80886,35	19113,65	2048,86	7951,14	30
31	0.4103,47	0.38199,59	4.30900,20	0.19099,79	0.03051,74	5.97948,26	29
32	4109,23	38171,91	80914,04	19085,95	2054,62	7945,38	28
33	4115,00	38144,24	80927,88	19072,12	2057,50	7942,50	27
34	4120,77	38116,59	80941,70	19058,29	2060,38	7939,61	26
35	4126,55	38089,97	80955,51	19044,49	2063,28	7936,72	25
36	4132,33	38061,36	80969,32	19030,68	2066,17	7933,83	24
37	4138,12	38033,78	80983,11	19016,88	2069,06	7930,94	23
38	4143,91	38006,22	80996,89	19003,11	2071,96	7928,04	22
39	4149,70	37978,68	81010,66	18989,34	2074,85	7925,15	21
40	4155,50	37951,16	81024,42	18975,52	2077,75	7922,25	20
41	0.4161,31	0.37923,66	4.30138,17	0.18961,83	0.03208,66	4.97919,34	19
42	4167,12	37896,18	81051,91	18948,09	2083,56	7916,44	18
43	4172,93	37868,73	81065,63	18934,37	2086,47	7913,53	17
44	4178,75	37841,29	81079,35	18920,64	2089,37	7910,62	16
45	4184,57	37813,88	81092,06	18906,94	2092,29	7907,71	15
46	4190,39	37786,49	81106,75	18893,25	2095,20	7904,80	14
47	4196,22	37759,12	81120,44	18879,56	2098,11	7901,89	13
48	4202,06	37731,76	81134,12	18865,88	2101,03	7898,97	12
49	4207,90	37704,43	81147,78	18852,22	2103,95	7896,05	11
50	4213,74	37677,13	81161,73	18838,56	2106,87	7893,13	10
51	0.4219,59	0.37649,84	4.31175,08	0.18824,92	0.03210,79	4.97890,20	9
52	4225,44	37622,57	81188,71	18811,29	2112,72	7887,28	8
53	4231,30	37595,32	81202,74	18797,66	2115,65	7884,35	7
54	4237,16	37568,10	81215,95	18784,05	2118,58	7881,42	6
55	4243,03	37540,89	81229,55	18770,44	2121,52	7878,48	5
56	4248,90	37513,71	81242,14	18756,86	2124,45	7875,55	4
57	4254,78	37486,54	81256,73	18743,27	2127,39	7872,61	3
58	4260,66	37459,40	81270,30	18729,70	2130,33	7869,67	2
59	4266,54	37432,28	81283,86	18716,16	2133,27	7866,71	1
60	4272,43	37405,17	81297,41	18702,59	2136,22	7863,78	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

M	Secants.	Cosecants.	Half Sines.	Half Cosec.	Half Sec.	Half Cos.	M
0	0.04272.43	0.37405.17	4.81297.41	0.18702.59	0.02136.22	4.97863.78	60
1	0.04278.32	0.37378.09	4.81310.95	0.18689.04	0.02139.16	4.97860.84	59
2	4284.22	37351.03	81324.48	18575.82	2142.11	7857.89	58
3	4290.12	37323.99	81338.00	18661.99	2145.06	7854.94	57
4	4296.03	37296.97	81356.51	18643.49	2148.02	7851.98	56
5	4301.94	37269.97	81365.01	18634.98	2150.97	7849.03	55
6	4307.85	37242.99	81378.50	18621.49	2153.93	7846.07	54
7	4313.77	37216.03	81391.98	18608.02	2156.88	7843.11	53
8	4319.70	37189.10	81405.45	18594.55	2159.86	7840.15	52
9	4325.63	37162.18	81418.91	18581.09	2162.82	7837.18	51
10	4331.56	37135.28	81542.36	18567.64	2165.78	7834.22	50
11	0.04337.50	0.37108.40	4.81445.80	0.18554.20	0.02168.75	4.97831.25	49
12	4343.44	37081.55	81459.28	18540.73	2171.72	7831.28	48
13	4349.39	37054.71	81472.64	18527.35	2174.69	7828.33	47
14	4355.34	37027.89	81486.05	18513.95	2177.67	7825.38	46
15	4361.30	37001.10	81499.45	18500.55	2180.75	7822.43	45
16	4367.26	36974.32	81512.84	18487.16	2183.83	7819.48	44
17	4373.22	36947.57	81526.21	18473.78	2186.91	7816.53	43
18	4379.19	36920.83	81539.58	18460.42	2189.99	7813.58	42
19	4385.17	36894.11	81552.94	18447.06	2193.08	7810.63	41
20	4391.14	36867.42	81566.29	18433.71	2196.17	7807.68	40
21	0.04397.13	0.36840.74	4.81579.63	0.18420.37	0.02198.57	4.97801.43	39
22	4403.11	36814.09	81592.95	18407.05	2201.56	7798.44	38
23	4409.11	36787.45	81609.27	18393.72	2204.56	7795.44	37
24	4415.10	36760.84	81619.58	18380.42	2207.55	7792.45	36
25	4421.10	36734.24	81632.88	18367.12	2210.55	7789.45	35
26	4427.11	36707.67	81646.16	18353.84	2213.56	7786.44	34
27	4433.12	36681.11	81659.44	18340.56	2216.56	7783.44	33
28	4439.13	36654.58	81672.71	18327.29	2219.57	7780.43	32
29	4445.15	36628.06	81685.97	18314.03	2222.58	7777.42	31
30	4451.18	36601.56	81699.22	18300.78	2225.59	7774.41	30
31	0.04457.20	0.36575.09	4.81712.45	0.18287.54	0.02228.60	4.97774.20	29
32	4457.24	36548.63	81725.68	18274.32	2228.61	7771.40	28
33	4463.27	36522.20	81738.90	18261.10	2231.62	7768.38	27
34	4469.31	36495.78	81752.11	18247.89	2234.64	7765.36	26
35	4475.36	36469.38	81765.31	18234.69	2237.66	7762.34	25
36	4481.41	36443.01	81778.49	18221.51	2240.68	7759.32	24
37	4487.47	36416.65	81791.67	18208.33	2243.71	7756.29	23
38	4493.52	36390.31	81804.84	18195.15	2246.74	7753.26	22
39	4499.58	36363.99	81818.00	18181.99	2249.77	7750.23	21
40	4505.65	36337.69	81831.15	18168.84	2252.79	7747.20	20
41	0.04517.73	0.36311.41	4.81844.20	0.18155.71	0.02258.86	4.97741.13	19
42	4513.81	36285.16	81857.42	18142.58	2255.88	7744.17	18
43	4519.89	36258.92	81870.54	18129.46	2258.91	7741.13	17
44	4525.98	36232.69	81883.65	18116.34	2261.95	7738.09	16
45	4532.07	36206.49	81896.75	18103.25	2264.99	7735.05	15
46	4538.16	36180.31	81909.84	18090.16	2268.02	7732.01	14
47	4544.26	36154.15	81922.92	18077.08	2271.08	7728.96	13
48	4550.37	36128.01	81935.99	18064.01	2274.13	7725.92	12
49	4556.48	36101.88	81949.06	18050.94	2277.18	7722.87	11
50	4562.59	36075.78	81962.11	18037.88	2280.24	7719.81	10
51	0.04578.71	0.36049.70	4.81975.15	0.18024.85	0.02289.36	4.97710.62	9
52	4568.83	36023.63	81978.18	18011.82	2283.42	7716.75	8
53	4575.06	35997.59	82001.20	17998.79	2286.48	7713.68	7
54	4581.29	35971.56	82014.22	17985.78	2289.54	7710.62	6
55	4587.53	35945.55	82027.22	17972.78	2292.61	7707.55	5
56	4593.77	35919.56	82040.22	17959.78	2295.69	7704.48	4
57	4599.52	35893.60	82053.20	17946.80	2298.76	7701.41	3
58	4605.67	35867.65	82066.17	17933.83	2301.84	7698.34	2
59	4611.82	35841.72	82079.14	17920.86	2304.91	7695.26	1
60	4617.98	35815.80	82092.10	17907.90	2307.99	7692.18	0
M	Cosecants.	Secants.	Half Cos.	Half Sec.	Half Cosec.	Half Sines.	M

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.04633,98	0.35813,80	4.82092,10	0.17907,90	0.02316,69	4.97623,01	60
1	0.04640,15	0.35789,91	4.82105,04	0.17894,96	0.02320,07	4.97619,93	59
2	4646,31	35764,04	82117,98	17882,02	2323,15	7676,84	58
3	4652,49	35738,18	82130,91	17869,09	2326,24	7673,75	57
4	4658,66	35712,35	82143,82	17856,18	2329,33	7670,67	56
5	4664,85	35686,53	82156,73	17843,27	2332,43	7667,57	55
6	4671,03	35660,74	82169,63	17830,37	2335,52	7664,48	54
7	4677,22	35634,96	82182,52	17817,48	2338,61	7661,39	53
8	4683,42	35609,20	82195,40	17804,60	2341,71	7658,29	52
9	4689,62	35583,46	82208,27	17791,73	2344,81	7655,19	51
10	4695,82	35557,74	82221,13	17778,87	2347,91	7652,09	50
11	0.04792,93	0.35532,04	4.82233,98	0.17766,02	0.02361,02	4.97612,98	49
12	4708,25	35506,35	82246,82	17753,18	2354,13	7645,87	48
13	4714,47	35480,69	82259,65	17740,35	2357,23	7642,76	47
14	4720,69	35455,04	82272,48	17727,52	2360,34	7639,66	46
15	4726,92	35429,42	82285,29	17714,71	2363,46	7636,54	45
16	4733,15	35403,81	82298,09	17701,91	2366,78	7633,42	44
17	4739,39	35378,22	82310,89	17689,11	2369,70	7630,30	43
18	4745,63	35352,65	82323,67	17676,33	2372,81	7627,18	42
19	4751,87	35327,10	82336,45	17663,55	2375,94	7624,06	41
20	4758,12	35301,56	82349,22	17650,78	2379,06	7620,94	40
21	0.04764,38	0.35276,05	4.82361,97	0.17638,03	0.02382,10	4.97612,98	39
22	4770,64	35250,55	82374,72	17625,27	2382,54	7614,68	38
23	4776,90	35225,08	82387,46	17612,54	2385,58	7611,55	37
24	4783,17	35199,62	82400,19	17599,81	2389,15	7608,41	36
25	4789,45	35174,18	82412,91	17587,09	2394,73	7605,27	35
26	4795,72	35148,76	82425,62	17574,38	2397,86	7602,14	34
27	4802,01	35123,35	82438,32	17561,67	2401,01	7598,99	33
28	4808,29	35097,97	82451,01	17548,98	2404,14	7595,85	32
29	4814,59	35072,60	82463,70	17536,30	2407,29	7592,70	31
30	4820,88	35047,26	82476,37	17523,63	2410,44	7589,56	30
31	0.04827,18	0.35021,98	4.82499,03	0.17510,97	0.02413,69	4.97626,41	29
32	4833,49	35096,72	82501,69	17498,31	2416,75	7583,25	28
33	4839,80	35071,32	82514,34	17485,66	2419,90	7580,10	27
34	4846,11	35046,05	82526,97	17473,03	2423,06	7576,94	26
35	4852,43	35020,80	82539,60	17460,40	2426,22	7573,78	25
36	4858,76	34995,56	82552,22	17447,78	2429,38	7570,62	24
37	4865,08	34970,34	82564,83	17435,17	2432,54	7567,46	23
38	4871,42	34945,14	82577,43	17422,57	2435,71	7564,29	22
39	4877,76	34919,96	82590,02	17409,98	2438,88	7561,12	21
40	4884,10	34894,79	82602,60	17397,39	2442,05	7557,95	20
41	0.04890,44	0.34869,65	4.82615,17	0.17384,83	0.02445,22	4.97654,78	19
42	4896,80	34844,52	82627,74	17372,26	2445,40	7551,60	18
43	4903,15	34819,41	82640,29	17359,71	2451,57	7548,42	17
44	4909,51	34794,32	82652,84	17347,16	2454,76	7545,24	16
45	4915,88	34769,25	82665,37	17334,63	2457,94	7542,06	15
46	4922,25	34744,19	82677,90	17322,10	2461,13	7538,87	14
47	4928,62	34719,16	82690,42	17309,58	2464,31	7535,69	13
48	4935,00	34694,14	82702,93	17297,07	2467,50	7532,50	12
49	4941,39	34669,14	82715,43	17284,57	2470,69	7529,30	11
50	4947,77	34644,16	82727,92	17272,08	2473,89	7526,11	10
51	0.04954,17	0.34619,12	4.82740,40	0.17259,59	0.02477,09	4.97422,91	9
52	4960,56	34594,25	82752,87	17247,13	2480,28	7519,72	8
53	4966,97	34569,32	82765,34	17234,66	2483,48	7516,51	7
54	4973,37	34544,41	82777,79	17222,21	2486,69	7513,31	6
55	4979,78	34519,52	82790,24	17209,76	2489,89	7510,11	5
56	4986,20	34494,64	82802,68	17197,34	2493,10	7506,90	4
57	4992,62	34469,79	82815,10	17184,90	2496,31	7503,69	3
58	4999,05	34444,95	82827,52	17172,48	2499,53	7500,47	2
59	5005,48	34420,13	82839,98	17160,07	2502,74	7497,26	1
60	5011,91	34395,32	82852,34	17147,66	2505,96	7494,04	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.05011,91	0.34295,32	4.82852,34	0.17147,66	0.02505,96	4.97494,04	66
1	0.05018,35	0.34270,54	4.82864,73	0.17135,27	0.02509,18	4.97490,82	59
2	5024,79	34245,77	82877,11	17122,89	2512,40	7487,60	58
3	5031,24	34221,02	82889,49	17110,51	2515,62	7484,38	57
4	5037,70	34196,29	82901,85	17098,15	2518,85	7481,15	56
5	5044,15	34171,58	82914,21	17085,79	2522,08	7477,92	55
6	5050,62	34146,88	82926,56	17073,44	2525,31	7474,69	54
7	5057,08	34122,20	82938,90	17061,10	2528,54	7471,46	53
8	5063,55	34097,54	82951,23	17058,77	2531,78	7468,22	52
9	5070,03	34072,90	82963,55	17036,45	2535,02	7464,98	51
10	5076,51	34048,27	82975,86	17024,14	2538,26	7461,74	50
11	0.05083,00	0.34023,67	4.82988,16	0.17011,83	0.02641,50	4.97458,50	49
12	5089,49	33999,07	83000,46	16999,53	2544,78	7455,25	48
13	5095,98	33974,50	83012,75	16987,25	2547,99	7452,01	47
14	5102,48	33949,95	83025,02	16974,98	2551,24	7448,76	46
15	5108,99	33925,41	83038,29	16961,71	2554,49	7445,50	45
16	5115,50	33900,89	83049,55	16950,45	2557,75	7442,25	44
17	5122,01	33876,39	83061,80	16938,19	2561,01	7438,99	43
18	5128,53	33851,90	83074,05	16925,95	2564,26	7435,73	42
19	5135,05	33827,43	83086,38	16913,72	2567,54	7432,47	41
20	5141,58	33802,98	83098,51	16901,49	2570,79	7429,21	40
21	0.05148,11	0.33778,55	4.83110,72	0.16889,27	0.02674,06	4.97454,96	39
22	5144,65	33754,14	83122,93	16877,07	2573,33	7422,67	38
23	5151,19	33729,74	83135,13	16864,87	2580,49	7419,40	37
24	5157,73	33705,36	83147,32	16852,78	2583,65	7416,14	36
25	5164,28	33680,90	83159,50	16840,50	2587,14	7412,86	35
26	5170,84	33656,55	83171,67	16828,33	2590,42	7409,58	34
27	5177,40	33632,32	83183,84	16816,16	2593,70	7406,30	33
28	5183,96	33608,01	83195,99	16804,01	2596,98	7403,02	32
29	5190,53	33583,72	83208,14	16791,86	2600,26	7399,73	31
30	5207,11	33559,44	83220,28	16779,72	2603,56	7396,44	30
31	0.05213,69	0.33535,18	4.83232,41	0.16767,59	0.02606,84	4.97393,15	29
32	5220,27	33510,94	83244,53	16755,47	2610,14	7389,86	28
33	5226,86	33486,71	83256,64	16743,36	2613,43	7386,57	27
34	5233,45	33462,51	83268,74	16731,26	2616,73	7383,27	26
35	5240,05	33438,32	83280,84	16719,16	2620,03	7379,97	25
36	5246,65	33414,14	83292,93	16707,07	2623,33	7376,67	24
37	5253,26	33389,99	83305,00	16694,99	2626,63	7373,37	23
38	5259,87	33365,85	83317,07	16682,93	2629,94	7370,06	22
39	5266,48	33341,72	83329,14	16670,86	2633,24	7366,76	21
40	5273,11	33317,62	83341,19	16658,81	2636,56	7363,44	20
41	0.05279,73	0.33298,53	4.83353,23	0.16646,77	0.02689,87	4.97360,13	19
42	5286,36	33274,46	83365,27	16634,73	2639,18	7359,82	18
43	5293,00	33250,41	83377,29	16622,71	2646,50	7356,50	17
44	5299,64	33226,37	83389,31	16610,68	2649,82	7353,18	16
45	5306,28	33202,35	83401,32	16598,68	2653,14	7349,86	15
46	5312,93	33178,35	83413,32	16586,68	2656,47	7346,53	14
47	5319,58	33154,36	83425,32	16574,68	2659,79	7343,21	13
48	5326,24	33130,39	83437,31	16562,69	2663,12	7339,88	12
49	5332,90	33106,44	83449,28	16550,72	2666,45	7336,55	11
50	5339,57	33082,50	83461,25	16538,75	2669,79	7333,21	10
51	0.05346,24	0.33053,58	4.83473,21	0.16526,79	0.02673,12	4.97326,88	9
52	5352,02	33029,68	83483,16	16514,84	2676,46	7329,54	8
53	5359,60	33005,80	83497,10	16502,90	2679,80	7326,20	7
54	5366,29	32981,93	83509,03	16490,97	2683,15	7322,85	6
55	5372,98	32958,08	83520,96	16479,04	2686,99	7319,51	5
56	5379,68	32934,24	83532,88	16467,12	2689,84	7316,16	4
57	5386,38	32910,42	83544,79	16455,21	2693,19	7306,81	3
58	5393,08	32886,62	83556,69	16443,31	2696,54	7303,46	2
59	5399,79	32862,84	83568,58	16431,42	2699,90	7300,10	1
60	5406,41	32839,07	83580,46	16419,54	2703,26	7296,74	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

M	Secants.	Cosecants.	Half Sines.	Half Cosec.	Half Sec.	Half Cof.	M
0	0.3406,51	0.32839,07	4.83580,46	0.16419,54	0.02703,86	4.97296,74	60
1	0.3413,83	0.32815,32	4.83592,34	0.16407,66	0.02706,62	4.97293,38	59
2	3419,95	32791,59	83604,20	16395,80	2709,97	7290,02	58
3	3426,68	32767,87	83616,06	16383,94	2713,34	7286,66	57
4	3433,41	32744,17	83627,91	16372,09	2716,71	7283,29	56
5	3440,15	32720,48	83639,76	16360,24	2720,08	7279,92	55
6	3446,90	32696,81	83651,59	16348,41	2723,45	7276,55	54
7	3453,64	32673,16	83663,42	16336,58	2726,82	7273,18	53
8	3460,40	32649,53	83675,23	16324,77	2730,20	7269,80	52
9	3467,15	32625,91	83687,04	16312,96	2733,58	7266,42	51
10	3473,91	32602,31	83698,84	16301,16	2736,96	7263,04	50
11	0.3480,68	0.32578,72	4.83710,64	0.16289,36	0.02740,34	4.97259,66	49
12	3487,43	32555,15	83722,42	16277,58	2743,73	7256,27	48
13	3494,23	32531,60	83734,20	16265,80	2747,13	7252,88	47
14	3501,01	32508,06	83745,97	16254,03	2750,51	7249,49	46
15	3507,80	32484,54	83757,73	16242,27	2753,90	7246,10	45
16	3514,59	32461,04	83769,48	16230,52	2757,30	7242,70	44
17	3521,38	32437,55	83781,22	16218,78	2760,69	7239,31	43
18	3528,18	32414,08	83792,96	16207,04	2764,09	7235,91	42
19	3534,99	32390,63	83804,68	16195,32	2767,49	7232,50	41
20	3541,79	32367,19	83816,40	16183,50	2770,90	7229,10	40
21	0.3548,61	0.32343,77	4.83828,12	0.16171,88	0.02774,31	4.97225,69	39
22	3555,43	32320,37	83839,81	16160,18	2777,72	7225,28	38
23	3562,25	32296,98	83851,51	16148,49	2781,13	7221,87	37
24	3569,08	32273,60	83863,20	16136,80	2784,54	7218,46	36
25	3575,91	32250,25	83874,87	16125,13	2787,96	7215,04	35
26	3582,75	32226,91	83886,54	16113,46	2791,38	7211,62	34
27	3589,59	32203,58	83898,21	16101,79	2794,80	7208,20	33
28	3596,44	32180,28	83909,86	16090,14	2798,22	7204,78	32
29	3603,29	32156,99	83921,50	16078,50	2801,65	7201,35	31
30	3610,15	32133,71	83933,14	16066,86	2805,08	7197,92	30
31	0.3617,01	0.32110,43	4.83944,77	0.16055,23	0.02808,51	4.97191,49	29
32	3623,88	32087,21	83955,39	16043,51	2811,94	7188,06	28
33	3630,75	32063,98	83968,01	16031,90	2815,38	7184,62	27
34	3637,62	32040,77	83979,61	16020,38	2818,81	7181,19	26
35	3644,51	32017,57	83991,21	16008,78	2822,27	7177,79	25
36	3651,39	31994,40	84002,82	15997,20	2825,70	7174,30	24
37	3658,28	31971,23	84014,38	15985,62	2829,19	7170,81	23
38	3665,18	31948,09	84025,95	15974,05	2832,59	7167,41	22
39	3672,08	31924,96	84037,52	15962,48	2836,04	7163,96	21
40	3678,98	31901,84	84049,08	15950,92	2839,49	7160,51	20
41	0.3685,89	0.31878,74	4.84060,63	0.15939,37	0.02842,95	4.97157,05	19
42	3692,80	31855,66	84072,17	15927,83	2846,40	7153,60	18
43	3699,72	31832,59	84083,70	15916,30	2849,86	7150,14	17
44	3706,65	31809,54	84095,23	15904,77	2853,33	7146,67	16
45	3713,57	31786,51	84106,74	15893,26	2856,79	7143,21	15
46	3720,51	31763,49	84118,25	15881,75	2860,26	7139,74	14
47	3727,45	31740,48	84129,76	15870,24	2863,72	7136,27	13
48	3734,39	31717,50	84141,25	15858,75	2867,19	7132,80	12
49	3741,34	31694,52	84152,74	15847,26	2870,67	7129,33	11
50	3748,29	31671,57	84164,21	15835,78	2874,15	7125,85	10
51	0.3755,24	0.31648,63	4.84175,68	0.15824,32	0.02877,62	4.97122,38	9
52	3762,21	31625,70	84187,15	15812,85	2881,51	7118,89	8
53	3769,17	31602,80	84198,60	15801,40	2884,59	7115,41	7
54	3776,14	31579,90	84210,05	15789,95	2888,07	7111,93	6
55	3783,12	31557,03	84221,48	15778,52	2891,56	7108,44	5
56	3790,10	31534,17	84232,91	15767,09	2895,05	7104,95	4
57	3797,08	31511,32	84244,34	15755,66	2898,55	7101,45	3
58	3804,08	31488,40	84255,75	15744,25	2902,04	7097,96	2
59	3811,07	31465,68	84267,16	15732,84	2905,54	7094,46	1
60	3818,07	31442,88	84278,56	15721,44	2909,04	7090,96	0
M	Cosecants.	Secants.	Half Cof.	Half Sec.	Half Cosec.	Half Sines	M

H

61 Degrees.

M	Secants.	Cosecants.	Half Sines.	Half Cosec.	Half Sec.	Half Cof.	M
0	0.03818,07	0.31442,88	4.84278,56	0.15721,44	0.02909,04	4.97090,96	60
1	0.03825,08	0.31420,09	4.84289,95	0.15710,04	0.02912,04	4.97087,96	59
2	0.03832,09	0.31397,33	4.84301,33	0.15698,66	0.02916,03	4.97083,95	58
3	0.03839,10	0.31374,58	4.84313,71	0.15687,29	0.02919,58	4.97080,43	57
4	0.03846,12	0.31351,84	4.84324,08	0.15675,92	0.02923,06	4.97076,94	56
5	0.03853,15	0.31329,12	4.84335,44	0.15664,56	0.02926,57	4.97073,42	55
6	0.03860,18	0.31306,41	4.84346,79	0.15653,21	0.02930,09	4.97069,91	54
7	0.03867,21	0.31283,72	4.84358,14	0.15641,86	0.02933,61	4.97066,39	53
8	0.03874,25	0.31261,05	4.84369,47	0.15630,53	0.02937,13	4.97063,87	52
9	0.03881,29	0.31238,39	4.84380,80	0.15619,20	0.02940,64	4.97059,35	51
10	0.03888,34	0.31215,75	4.84392,17	0.15607,88	0.02944,17	4.97055,83	50
11	0.03895,39	0.31193,12	4.84403,44	0.15596,66	0.02947,69	4.97052,30	49
12	0.03902,45	0.31170,51	4.84414,79	0.15585,21	0.02951,23	4.97048,77	48
13	0.03909,52	0.31147,91	4.84426,04	0.15573,96	0.02954,76	4.97045,24	47
14	0.03916,58	0.31125,33	4.84437,33	0.15562,66	0.02958,29	4.97041,71	46
15	0.03923,66	0.31102,77	4.84448,61	0.15551,39	0.02961,83	4.97038,17	45
16	0.03930,73	0.31080,22	4.84459,89	0.15540,11	0.02965,31	4.97034,63	44
17	0.03937,81	0.31057,68	4.84471,16	0.15528,84	0.02968,92	4.97031,09	43
18	0.03944,90	0.31035,16	4.84482,42	0.15517,58	0.02972,45	4.97027,55	42
19	0.03951,99	0.31012,66	4.84493,67	0.15506,33	0.02975,99	4.97024,00	41
20	0.03959,09	0.30990,17	4.84504,91	0.15495,08	0.02979,55	4.97020,45	40
21	0.03966,19	0.30967,69	4.84516,15	0.15483,85	0.02983,10	4.97016,90	39
22	0.03973,30	0.30945,24	4.84527,38	0.15472,62	0.02986,65	4.97013,35	38
23	0.03980,41	0.30922,79	4.84538,60	0.15461,40	0.02990,21	4.97009,79	37
24	0.03987,52	0.30900,36	4.84549,82	0.15450,18	0.02993,76	4.97006,24	36
25	0.03994,65	0.30877,95	4.84561,02	0.15438,97	0.02997,33	4.97002,67	35
26	0.04001,77	0.30855,55	4.84572,22	0.15427,77	0.03000,89	4.97000,11	34
27	0.04008,90	0.30833,17	4.84583,41	0.15416,59	0.03004,45	4.97000,55	33
28	0.04016,04	0.30810,81	4.84594,59	0.15405,41	0.03008,02	4.97001,98	32
29	0.04023,18	0.30788,45	4.84605,77	0.15394,23	0.03011,59	4.97002,41	31
30	0.04030,32	0.30766,12	4.84616,94	0.15383,06	0.03015,16	4.97002,84	30
31	0.04037,47	0.30743,80	4.84628,10	0.15371,90	0.03018,74	4.97002,28	29
32	0.04044,63	0.30721,49	4.84639,25	0.15360,75	0.03022,32	4.97001,71	28
33	0.04051,79	0.30699,20	4.84650,40	0.15349,60	0.03025,89	4.97001,14	27
34	0.04058,95	0.30676,92	4.84661,54	0.15338,46	0.03029,48	4.97000,57	26
35	0.04066,12	0.30654,66	4.84672,67	0.15327,33	0.03033,06	4.97000,00	25
36	0.04073,29	0.30632,42	4.84683,79	0.15316,21	0.03036,65	4.97000,43	24
37	0.04080,47	0.30610,19	4.84694,90	0.15305,10	0.03040,24	4.97000,86	23
38	0.04087,66	0.30587,97	4.84706,01	0.15293,99	0.03043,83	4.97001,29	22
39	0.04094,85	0.30565,77	4.84717,11	0.15282,88	0.03047,42	4.97001,72	21
40	0.04102,04	0.30543,58	4.84728,21	0.15271,79	0.03051,02	4.97002,15	20
41	0.04109,24	0.30521,41	4.84739,29	0.15260,71	0.03054,62	4.97002,58	19
42	0.04116,44	0.30499,26	4.84750,37	0.15249,63	0.03058,22	4.97002,01	18
43	0.04123,65	0.30477,12	4.84761,44	0.15238,56	0.03061,83	4.97001,44	17
44	0.04130,86	0.30454,99	4.84772,50	0.15227,50	0.03065,43	4.97001,87	16
45	0.04138,08	0.30432,88	4.84783,56	0.15216,44	0.03069,04	4.97001,30	15
46	0.04145,30	0.30410,78	4.84794,61	0.15205,39	0.03072,65	4.97001,73	14
47	0.04152,53	0.30388,70	4.84805,65	0.15194,35	0.03076,26	4.97001,16	13
48	0.04159,76	0.30366,64	4.84816,68	0.15183,32	0.03079,88	4.97001,59	12
49	0.04167,00	0.30344,59	4.84827,70	0.15172,30	0.03083,50	4.97002,02	11
50	0.04174,24	0.30322,55	4.84838,72	0.15161,28	0.03087,12	4.97002,45	10
51	0.04181,49	0.30300,53	4.84849,73	0.15150,27	0.03090,75	4.97002,88	9
52	0.04188,74	0.30278,52	4.84860,74	0.15139,26	0.03094,37	4.97003,31	8
53	0.04196,00	0.30256,53	4.84871,73	0.15128,27	0.03098,00	4.97003,74	7
54	0.04203,26	0.30234,55	4.84882,72	0.15117,27	0.03101,63	4.97004,17	6
55	0.04210,53	0.30212,59	4.84893,70	0.15106,29	0.03105,27	4.97004,60	5
56	0.04217,80	0.30190,64	4.84904,68	0.15095,32	0.03108,90	4.97005,03	4
57	0.04225,08	0.30168,71	4.84915,64	0.15084,36	0.03112,54	4.97005,46	3
58	0.04232,36	0.30146,79	4.84926,60	0.15073,40	0.03116,18	4.97005,89	2
59	0.04239,65	0.30124,89	4.84937,55	0.15062,45	0.03119,82	4.97006,32	1
60	0.04246,94	0.30103,00	4.84948,50	0.15051,50	0.03123,47	4.97006,75	0
M	Cosecants.	Secants.	Half Cof.	Half Sec.	Half Cosec.	Half Sines.	M

M	Secants.	Cosecants.	Half Sines.	Half Cosec.	Half Sec.	Half Tan.	M
0	0.0625,94	0.30103,00	4.84942,50	0.15051,50	0.03123,47	4.96876,53	60
1	0.0625,94	0.30081,13	4.84969,42	0.15040,57	0.03127,12	4.96872,88	59
2	0.0625,94	0.30059,27	4.84990,36	0.15029,63	0.03130,76	4.96869,23	58
3	0.0625,94	0.30037,42	4.85011,29	0.15018,71	0.03134,42	4.96865,58	57
4	0.0625,94	0.30015,59	4.85032,20	0.15007,79	0.03138,08	4.96861,92	56
5	0.0625,94	0.29993,78	4.85053,11	0.14996,89	0.03141,74	4.96858,26	55
6	0.0625,94	0.29971,98	4.85074,01	0.14985,99	0.03145,39	4.96854,60	54
7	0.0625,94	0.29950,19	4.85095,90	0.14975,09	0.03149,06	4.96850,94	53
8	0.0625,94	0.29928,42	4.85116,79	0.14964,21	0.03152,72	4.96847,28	52
9	0.0625,94	0.29906,66	4.85137,67	0.14953,33	0.03156,39	4.96843,61	51
10	0.0625,94	0.29884,92	4.85158,54	0.14942,46	0.03160,06	4.96839,94	50
11	0.0625,94	0.29863,19	4.85179,40	0.14931,59	0.03163,73	4.96836,27	49
12	0.0625,94	0.29841,48	4.85199,26	0.14920,74	0.03167,41	4.96832,59	48
13	0.0625,94	0.29819,78	4.85219,11	0.14909,89	0.03171,09	4.96828,91	47
14	0.0625,94	0.29798,10	4.85239,05	0.14899,05	0.03174,76	4.96825,23	46
15	0.0625,94	0.29776,43	4.85258,98	0.14888,22	0.03178,45	4.96821,55	45
16	0.0625,94	0.29754,77	4.85278,91	0.14877,38	0.03182,13	4.96817,87	44
17	0.0625,94	0.29733,13	4.85298,83	0.14866,56	0.03185,82	4.96814,18	43
18	0.0625,94	0.29711,51	4.85318,74	0.14855,76	0.03189,51	4.96810,49	42
19	0.0625,94	0.29689,89	4.85338,65	0.14844,95	0.03193,20	4.96806,80	41
20	0.0625,94	0.29668,30	4.85358,55	0.14834,15	0.03196,90	4.96803,10	40
21	0.0625,94	0.29646,71	4.85378,44	0.14823,35	0.03200,60	4.96799,40	39
22	0.0625,94	0.29625,14	4.85398,33	0.14812,57	0.03204,29	4.96795,70	38
23	0.0625,94	0.29603,59	4.85418,20	0.14801,80	0.03207,99	4.96792,00	37
24	0.0625,94	0.29582,05	4.85438,07	0.14791,03	0.03211,70	4.96788,30	36
25	0.0625,94	0.29560,53	4.85457,93	0.14780,27	0.03215,41	4.96784,59	35
26	0.0625,94	0.29539,01	4.85477,78	0.14769,51	0.03219,12	4.96780,88	34
27	0.0625,94	0.29517,52	4.85497,62	0.14758,76	0.03222,83	4.96777,17	33
28	0.0625,94	0.29496,03	4.85517,45	0.14748,01	0.03226,54	4.96773,46	32
29	0.0625,94	0.29474,57	4.85537,27	0.14737,29	0.03230,25	4.96769,74	31
30	0.0625,94	0.29453,11	4.85557,08	0.14726,56	0.03233,98	4.96766,03	30
31	0.0625,94	0.29431,67	4.85576,88	0.14715,84	0.03237,71	4.96762,32	29
32	0.0625,94	0.29410,25	4.85596,67	0.14705,13	0.03241,43	4.96758,61	28
33	0.0625,94	0.29388,84	4.85616,45	0.14694,42	0.03245,16	4.96754,90	27
34	0.0625,94	0.29367,44	4.85636,23	0.14683,72	0.03248,89	4.96751,19	26
35	0.0625,94	0.29346,06	4.85656,00	0.14673,03	0.03252,62	4.96747,48	25
36	0.0625,94	0.29324,69	4.85675,76	0.14662,35	0.03256,35	4.96743,77	24
37	0.0625,94	0.29303,33	4.85695,51	0.14651,67	0.03260,09	4.96739,91	23
38	0.0625,94	0.29281,99	4.85715,25	0.14640,99	0.03263,83	4.96736,17	22
39	0.0625,94	0.29260,67	4.85735,00	0.14630,32	0.03267,57	4.96732,43	21
40	0.0625,94	0.29239,36	4.85754,73	0.14619,68	0.03271,31	4.96728,69	20
41	0.0625,94	0.29218,06	4.85774,45	0.14609,03	0.03275,06	4.96724,94	19
42	0.0625,94	0.29196,77	4.85794,16	0.14598,39	0.03278,81	4.96721,19	18
43	0.0625,94	0.29175,50	4.85813,85	0.14587,75	0.03282,56	4.96717,44	17
44	0.0625,94	0.29154,25	4.85833,53	0.14577,13	0.03286,31	4.96713,68	16
45	0.0625,94	0.29133,01	4.85853,20	0.14566,51	0.03290,07	4.96709,93	15
46	0.0625,94	0.29111,78	4.85872,86	0.14555,89	0.03293,83	4.96706,17	14
47	0.0625,94	0.29090,57	4.85892,51	0.14545,29	0.03297,59	4.96702,41	13
48	0.0625,94	0.29069,37	4.85912,15	0.14534,69	0.03301,36	4.96698,65	12
49	0.0625,94	0.29048,18	4.85931,78	0.14524,09	0.03305,13	4.96694,88	11
50	0.0625,94	0.29027,01	4.85951,40	0.14513,51	0.03308,89	4.96691,11	10
51	0.0625,94	0.29005,85	4.85971,01	0.14502,93	0.03312,66	4.96687,33	9
52	0.0625,94	0.28984,71	4.85990,61	0.14492,35	0.03316,44	4.96683,56	8
53	0.0625,94	0.28963,58	4.86010,21	0.14481,79	0.03320,21	4.96679,79	7
54	0.0625,94	0.28942,47	4.86029,79	0.14471,24	0.03323,99	4.96676,00	6
55	0.0625,94	0.28921,37	4.86049,36	0.14460,69	0.03327,77	4.96672,22	5
56	0.0625,94	0.28900,28	4.86068,91	0.14450,14	0.03331,56	4.96668,44	4
57	0.0625,94	0.28879,20	4.86088,45	0.14439,50	0.03335,35	4.96664,65	3
58	0.0625,94	0.28858,14	4.86107,98	0.14429,07	0.03339,14	4.96660,86	2
59	0.0625,94	0.28837,10	4.86127,49	0.14418,55	0.03342,93	4.96657,07	1
60	0.0625,94	0.28816,07	4.86146,98	0.14408,04	0.03346,72	4.96653,28	0
M	Cosecants.	Secants.	Half Cof.	Half Sec.	Half Cosec.	Half Sines.	M

M	Secants.	Cosecants.	Half Sines.	Half Cosec.	Half Sec.	Half Cof.	M
0	0.06693,44	0.28816,07	4.85591,96	0.14408,04	0.0326,72	4.96653,28	60
1	0.06701,03	0.28795,05	4.85602,47	0.14397,53	0.03350,52	4.96649,48	59
2	6708,63	28774,04	85612,98	14387,03	3354,32	6645,68	58
3	6715,24	28753,05	85623,47	14376,53	3358,12	6641,88	57
4	6723,84	28732,08	85633,96	14366,04	3361,92	6638,08	56
5	6731,46	28711,11	85644,44	14355,55	3365,73	6634,27	55
6	6739,08	28690,17	85654,91	14345,08	3369,54	6630,46	54
7	6746,70	28669,23	85665,38	14334,62	3373,35	6626,65	53
8	6754,33	28648,31	85675,84	14324,16	3377,17	6622,83	52
9	6761,96	28627,40	85686,30	14313,70	3380,98	6619,02	51
10	6769,60	28606,51	85696,74	14303,26	3384,80	6615,20	50
11	0.06777,24	0.28585,63	4.85707,18	0.14292,82	0.03388,62	4.96611,38	49
12	6784,89	28564,76	85718,62	14281,38	3392,45	6607,55	48
13	6792,54	28543,91	85728,04	14271,96	3396,27	6603,73	47
14	6800,20	28523,07	85738,46	14261,54	3400,10	6599,90	46
15	6807,87	28502,24	85748,88	14251,12	3403,94	6596,06	45
16	6815,53	28481,43	85759,28	14240,72	3407,76	6592,23	44
17	6823,21	28460,63	85769,68	14230,31	3411,61	6588,39	43
18	6830,89	28439,85	85780,07	14219,93	3415,44	6584,55	42
19	6838,57	28419,08	85790,46	14209,54	3419,29	6580,71	41
20	6846,26	28398,32	85800,84	14199,16	3423,13	6576,87	40
21	0.06853,95	0.28377,57	4.85811,21	0.14188,79	0.03423,97	4.96573,01	39
22	6861,65	28356,84	85821,58	14178,42	3426,83	6569,17	38
23	6869,35	28336,13	85831,93	14168,07	3429,67	6565,32	37
24	6877,06	28315,42	85842,29	14157,71	3432,53	6561,47	36
25	6884,78	28294,74	85852,63	14147,37	3435,39	6557,61	35
26	6892,50	28274,06	85862,97	14137,03	3438,25	6553,75	34
27	6900,22	28253,40	85873,30	14126,70	3440,11	6549,89	33
28	6907,95	28232,75	85883,62	14115,38	3442,98	6546,02	32
29	6915,68	28212,11	85893,94	14105,06	3445,84	6542,16	31
30	6923,42	28191,49	85904,25	14094,75	3448,71	6538,29	30
31	0.06931,17	0.28170,88	4.85914,56	0.14085,44	0.03465,58	4.96534,41	29
32	6938,91	28150,29	85924,85	14075,15	3450,46	6530,54	28
33	6946,67	28129,70	85935,15	14064,85	3453,34	6526,66	27
34	6954,43	28109,14	85945,43	14054,57	3456,22	6522,78	26
35	6962,19	28088,58	85955,71	14044,29	3459,10	6518,90	25
36	6969,96	28068,04	85965,98	14034,02	3461,98	6515,02	24
37	6977,74	28047,51	85976,24	14023,76	3464,87	6511,13	23
38	6985,52	28027,00	85986,50	14013,50	3467,76	6507,24	22
39	6993,30	28006,50	85996,75	14003,25	3469,65	6503,35	21
40	7001,09	27986,01	86006,99	13993,01	3470,54	6499,45	20
41	0.07008,88	0.27965,53	4.76017,23	0.13982,76	0.03504,44	4.96495,56	19
42	7016,68	27945,07	86027,16	13972,53	3473,44	6495,56	18
43	7024,49	27924,62	86037,69	13962,31	3476,32	6491,66	17
44	7032,30	27904,19	86047,90	13952,09	3479,21	6487,75	16
45	7040,11	27883,77	86058,11	13941,89	3482,10	6483,85	15
46	7047,93	27863,36	86068,32	13931,68	3484,98	6479,94	14
47	7055,76	27842,96	86078,52	13921,48	3487,88	6476,03	13
48	7063,59	27822,58	86088,71	13911,28	3490,77	6472,12	12
49	7071,43	27802,21	86098,89	13901,11	3493,66	6468,20	11
50	7079,27	27781,86	86109,07	13890,93	3496,56	6464,28	10
51	0.07076,11	0.27761,52	4.86119,24	0.13880,76	0.03543,56	4.96456,44	9
52	7094,06	27741,19	86129,40	13870,59	3499,47	6460,35	8
53	7102,82	27720,87	86139,56	13860,42	3502,37	6456,44	7
54	7110,68	27700,57	86149,76	13850,29	3505,27	6452,52	6
55	7118,55	27680,28	86159,86	13840,14	3508,17	6448,60	5
56	7126,42	27660,00	86170,00	13830,00	3511,07	6444,68	4
57	7134,29	27639,74	86180,13	13819,87	3513,97	6440,75	3
58	7142,17	27619,49	86190,25	13809,75	3516,87	6436,81	2
59	7150,06	27599,25	86200,37	13799,62	3519,77	6432,87	1
60	7157,95	27579,03	86210,48	13789,52	3522,67	6428,92	0
M	Cosecants.	Secants.	Half Cof.	Half Sec.	Half Cotes.	Half Sines.	M

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.07157.95	0.27579.03	4.86310.48	0.13789.53	0.03578.98	4.96431.08	60
1	0.07165.85	0.27558.82	4.86290.69	0.13779.41	0.03558.93	4.96417.07	59
2	7173.75	27538.62	86230.69	13769.31	3526.88	6413.12	58
3	7181.66	27518.44	86240.78	13759.22	3590.83	6409.17	57
4	7189.67	27498.26	86250.87	13749.13	3594.78	6405.21	56
5	7197.49	27478.11	86260.94	13739.06	3598.75	6401.25	55
6	7205.41	27457.96	86271.02	13728.98	3602.71	6397.29	54
7	7213.34	27437.83	86281.08	13719.91	3606.67	6393.33	53
8	7221.27	27417.71	86291.14	13708.86	3610.64	6389.36	52
9	7229.21	27397.60	86301.20	13698.80	3614.60	6385.39	51
10	7237.15	27377.51	86311.24	13688.76	3618.57	6381.42	50
11	0.07245.10	0.27357.43	4.86321.28	0.13678.71	0.03622.55	4.96377.45	49
12	7243.05	27337.36	86331.32	13668.68	3622.53	6377.47	48
13	7261.01	27317.31	86341.34	13658.66	3630.51	6369.49	47
14	7268.97	27297.27	86351.36	13648.64	3634.48	6365.51	46
15	7276.94	27277.24	86361.38	13638.62	3638.47	6361.53	45
16	7284.91	27257.22	86371.39	13628.61	3642.46	6357.54	44
17	7292.89	27237.22	86381.39	13618.61	3646.45	6353.55	43
18	7300.87	27217.23	86391.38	13608.62	3650.43	6349.56	42
19	7308.86	27197.25	86401.36	13598.64	3654.42	6345.57	41
20	7316.86	27177.29	86411.35	13588.65	3658.43	6341.57	40
21	0.07324.86	0.27157.33	4.86421.33	0.13578.66	0.03662.43	4.96337.57	39
22	7332.86	27137.40	86431.30	13568.70	3666.43	6333.57	38
23	7340.87	27117.47	86441.27	13558.72	3670.44	6329.56	37
24	7348.88	27097.56	86451.22	13548.78	3674.44	6325.56	36
25	7356.90	27077.66	86461.17	13538.83	3678.45	6321.55	35
26	7364.93	27057.77	86471.11	13528.89	3682.46	6317.53	34
27	7372.96	27037.90	86481.05	13518.94	3686.48	6313.52	33
28	7380.99	27018.03	86490.98	13509.02	3690.50	6309.50	32
29	7389.04	26998.18	86500.91	13499.09	3694.52	6305.48	31
30	7397.08	26978.35	86510.82	13489.18	3698.54	6301.46	30
31	0.07405.13	0.26958.52	4.86520.74	0.13479.26	0.03702.57	4.96297.43	29
32	7413.19	26938.71	86530.64	13469.36	3706.59	6293.40	28
33	7421.25	26918.91	86540.54	13459.46	3710.63	6289.37	27
34	7429.31	26899.13	86550.43	13449.56	3714.66	6285.34	26
35	7437.39	26879.36	86560.32	13439.68	3718.70	6281.30	25
36	7445.46	26859.60	86570.20	13439.80	3722.73	6277.27	24
37	7453.54	26839.85	86580.07	13429.92	3726.77	6273.23	23
38	7461.63	26820.11	86589.94	13420.06	3730.82	6269.18	22
39	7469.72	26800.36	86599.80	13400.20	3734.86	6265.14	21
40	7477.82	26780.68	86609.66	13390.34	3738.91	6261.09	20
41	0.07485.92	0.26760.98	4.86619.51	0.13380.49	0.03742.96	4.96257.04	19
42	7494.03	26741.30	86629.35	13370.66	3747.02	6252.98	18
43	7502.14	26721.63	86639.18	13360.81	3751.07	6248.93	17
44	7510.24	26701.97	86649.01	13350.98	3755.13	6244.87	16
45	7518.39	26682.32	86658.84	13341.16	3759.20	6240.80	15
46	7526.51	26662.69	86668.65	13331.34	3763.26	6236.74	14
47	7534.65	26643.07	86678.46	13321.54	3767.32	6232.67	13
48	7542.79	26623.46	86688.27	13311.73	3771.40	6228.60	12
49	7550.93	26603.86	86698.07	13301.93	3775.46	6224.53	11
50	7559.08	26584.28	86707.86	13292.14	3779.54	6220.46	10
51	0.07567.33	0.26564.71	4.86717.64	0.13282.35	0.03783.62	4.96216.38	9
52	7575.39	26545.15	86727.42	13272.57	3787.70	6212.32	8
53	7583.56	26525.60	86737.20	13262.80	3791.78	6208.22	7
54	7591.73	26506.07	86746.96	13253.04	3795.86	6204.14	6
55	7599.90	26486.55	86756.72	13243.27	3799.95	6200.05	5
56	7608.09	26467.04	86766.48	13233.51	3804.05	6195.95	4
57	7616.27	26447.54	86776.23	13223.77	3808.14	6191.86	3
58	7624.46	26428.05	86785.97	13214.03	3812.23	6187.77	2
59	7632.66	26408.58	86795.71	13204.29	3816.33	6183.67	1
60	7640.86	26389.12	86805.44	13194.66	3820.43	6179.57	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

M	Secants.	Cosecants.	Half Sines.	Half Cosec.	Half Sec.	Half Cof.	M
0	0.07640,86	0.26389,12	4.86805,44	0.13194,56	0.02820,43	4.96179,57	60
1	0.07649,07	0.26369,68	4.86815,16	0.13184,84	0.02824,54	4.96175,46	59
2	767,28	26350,24	86829,88	13170,12	3828,64	6171,36	58
3	768,50	26330,82	86834,59	13165,41	3832,75	6167,25	57
4	7673,72	26311,41	86844,29	13155,71	3836,86	6163,14	56
5	7681,95	26292,01	86853,99	13146,01	3840,97	6159,02	55
6	7690,18	26272,63	86863,68	13136,32	3845,09	6154,91	54
7	7698,42	26253,25	86873,37	13126,62	3849,21	6150,79	53
8	7706,66	26233,89	86883,05	13116,95	3853,33	6146,67	52
9	7714,91	26214,54	86892,73	13107,27	3857,46	6142,54	51
10	7723,16	26195,21	86902,39	13097,60	3861,58	6138,42	50
11	0.07731,42	0.26175,88	4.86912,06	0.13087,94	0.02826,71	4.96134,29	49
12	7739,68	26156,57	86921,71	13078,28	3869,84	6130,16	48
13	7747,95	26137,27	86931,36	13068,64	3873,97	6126,02	47
14	7756,23	26117,99	86941,00	13058,99	3878,12	6121,88	46
15	7764,51	26098,71	86950,64	13049,36	3882,26	6117,74	45
16	7772,79	26079,45	86960,27	13039,73	3886,40	6113,60	44
17	7781,09	26060,20	86969,90	13030,10	3890,54	6109,45	43
18	7789,38	26040,96	86979,52	13020,48	3894,69	6105,31	42
19	7797,68	26021,73	86989,13	13010,86	3898,84	6101,16	41
20	7805,99	26002,52	86998,74	13001,26	3902,99	6097,00	40
21	0.07814,30	0.25983,32	4.87008,34	0.12991,66	0.02830,15	4.96092,85	39
22	7812,62	25964,13	87017,93	12982,07	3911,31	6088,69	38
23	7820,94	25944,95	87027,52	12972,48	3915,47	6084,53	37
24	7829,27	25925,79	87037,10	12962,90	3919,64	6080,36	36
25	7847,60	25906,63	87046,68	12953,31	3923,80	6076,20	35
26	7855,94	25887,49	87056,25	12943,75	3927,97	6072,03	34
27	7864,28	25868,36	87065,82	12934,18	3932,14	6067,86	33
28	7872,63	25849,25	87075,37	12924,62	3936,32	6063,68	32
29	7880,98	25830,14	87084,93	12915,07	3940,49	6059,51	31
30	7889,34	25811,05	87094,47	12905,53	3944,67	6055,33	30
31	0.07897,71	0.25791,97	4.87104,01	0.12895,98	0.02834,86	9.96051,14	29
32	7906,07	25772,90	87113,55	12886,45	3953,04	6046,96	28
33	7914,45	25753,84	87123,08	12876,92	3957,22	6042,77	27
34	7922,83	25734,80	87132,60	12867,40	3961,42	6038,58	26
35	7931,22	25715,77	87142,11	12857,89	3965,61	6034,39	25
36	7939,61	25696,75	87151,62	12848,38	3969,81	6030,19	24
37	7948,00	25677,74	87161,13	12838,87	3974,00	6026,00	23
38	7956,40	25658,74	87170,63	12829,37	3978,20	6021,80	22
39	7964,81	25639,76	87180,12	12819,88	3982,41	6017,59	21
40	7973,22	25620,79	87189,60	12810,39	3986,61	6013,39	20
41	0.07981,64	0.25601,83	4.87199,08	0.12800,92	0.02839,82	9.96009,18	19
42	7990,06	25582,88	87208,56	12791,44	3995,03	6004,97	18
43	7998,49	25563,94	87218,03	12781,97	3999,25	6000,75	17
44	8006,92	25545,02	87227,49	12772,51	4003,46	5996,54	16
45	8015,36	25526,10	87236,95	12763,05	4007,68	5992,32	15
46	8023,81	25507,20	87246,40	12753,60	4011,91	5988,09	14
47	8032,25	25488,31	87255,84	12744,16	4016,13	5983,87	13
48	8040,71	25469,44	87265,28	12734,72	4020,36	5979,64	12
49	8049,17	25450,57	87274,74	12725,28	4024,58	5975,41	11
50	8057,63	25431,72	87284,14	12715,76	4028,82	5971,18	10
51	0.08066,10	0.25412,88	4.87293,56	0.12706,44	0.02843,05	9.95966,95	9
52	8074,58	25394,05	87302,97	12697,03	4037,29	5962,71	8
53	8083,06	25375,23	87312,48	12687,62	4041,53	5958,47	7
54	8091,55	25356,42	87321,79	12678,21	4045,78	5954,22	6
55	8100,04	25337,63	87331,18	12668,81	4050,02	5949,98	5
56	8108,54	25318,85	87340,57	12659,43	4054,27	5945,73	4
57	8117,04	25300,08	87349,96	12650,04	4058,52	5941,48	3
58	8125,55	25281,32	87359,34	12640,66	4062,78	5937,22	2
59	8134,06	25262,57	87368,71	12631,28	4067,03	5932,97	1
60	8142,58	25243,83	87378,08	12621,92	4071,29	5928,71	0
M	Cosecants.	Secants.	Half Cof.	Half Sec.	Half Cosec.	Half Sines.	M

34 Degrees.

35

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.08142,58	0.25243,83	4.87378,08	0.12621,92	0.04071,29	4.95928,71	60
1	0.08151,10	0.25225,11	4.87387,44	0.12612,56	0.04075,55	4.95924,45	59
2	8159,63	25206,40	87396,80	12603,20	4079,81	5920,18	58
3	8168,17	25187,70	87406,15	12593,85	4084,09	5925,91	57
4	8176,71	25169,01	87415,49	12584,51	4088,36	5931,64	56
5	8185,25	25150,33	87424,83	12575,17	4092,63	5937,37	55
6	8193,80	25131,67	87434,16	12565,86	4096,90	5943,10	54
7	8202,36	25113,02	87463,49	12556,51	4101,18	5948,82	53
8	8210,92	25094,38	87458,81	12547,19	4105,46	5954,54	52
9	8219,49	25075,75	87462,12	12537,87	4109,75	5960,26	51
10	8228,06	25057,13	87471,43	12528,57	4114,03	5966,97	50
11	0.08236,64	0.25538,52	4.87480,74	0.12519,26	0.04118,32	4.95881,68	49
12	8235,22	25039,93	87490,03	12509,97	4122,61	5972,39	48
13	8253,81	25021,34	87499,33	12500,67	4126,91	5978,09	47
14	8262,40	24982,77	87508,61	12491,38	4131,20	5983,80	46
15	8271,00	24964,21	87517,89	12482,11	4135,50	5989,50	45
16	8279,60	24945,66	87527,17	12472,83	4139,80	5995,20	44
17	8288,21	24927,13	87536,43	12463,57	4144,11	5995,89	43
18	8296,83	24908,60	87545,70	12454,30	4148,41	5995,58	42
19	8305,45	24890,09	87554,95	12445,04	4152,73	5995,27	41
20	8314,07	24871,58	87564,21	12435,79	4157,04	5994,96	40
21	0.08322,70	0.24853,09	4.87573,45	0.12426,54	0.04161,35	4.95838,65	39
22	8331,34	24834,62	87582,69	12417,31	4165,67	5994,65	38
23	8339,98	24816,15	87591,92	12408,08	4169,99	5994,34	37
24	8348,63	24797,69	87601,15	12398,84	4174,32	5994,03	36
25	8357,28	24779,25	87610,37	12389,62	4178,64	5993,72	35
26	8365,94	24760,81	87619,59	12380,41	4182,97	5993,41	34
27	8374,61	24742,39	87628,80	12371,20	4187,31	5993,10	33
28	8383,27	24723,98	87638,01	12361,98	4191,64	5992,79	32
29	8391,95	24705,58	87647,21	12352,79	4195,98	5992,48	31
30	8400,63	24687,20	87656,40	12343,60	4200,32	5992,17	30
31	0.08409,31	0.24668,82	4.87665,59	0.12334,41	0.04204,65	4.95795,34	29
32	8418,00	24650,46	87674,77	12325,33	4209,00	5991,86	28
33	8426,70	24632,10	87683,93	12316,05	4213,35	5991,55	27
34	8435,40	24613,76	87693,12	12306,88	4217,70	5991,24	26
35	8444,11	24595,43	87702,28	12297,71	4222,06	5990,93	25
36	8452,82	24577,12	87711,44	12288,56	4226,41	5990,62	24
37	8461,54	24558,81	87720,59	12279,41	4230,77	5990,31	23
38	8470,26	24540,51	87729,74	12270,26	4235,13	5990,00	22
39	8478,99	24522,23	87738,88	12261,12	4239,40	5989,69	21
40	8487,72	24503,96	87748,02	12251,98	4243,66	5989,38	20
41	0.08496,46	0.24485,69	4.87757,15	0.12242,85	0.04248,23	4.95751,72	19
42	8505,21	24467,44	87766,28	12233,72	4253,00	5989,07	18
43	8513,96	24449,20	87775,40	12224,60	4256,98	5988,76	17
44	8522,71	24430,98	87784,51	12215,49	4261,35	5988,45	16
45	8531,48	24412,76	87793,62	12206,38	4265,74	5988,14	15
46	8540,24	24394,56	87802,72	12197,28	4270,12	5987,83	14
47	8549,01	24376,36	87811,82	12188,18	4274,51	5987,52	13
48	8557,79	24358,18	87820,91	12179,09	4278,90	5987,21	12
49	8566,58	24340,01	87829,99	12170,01	4283,29	5986,90	11
50	8575,36	24321,85	87839,07	12160,93	4287,68	5986,59	10
51	0.08584,16	0.24303,70	4.87848,15	0.12151,85	0.04292,08	4.95707,91	9
52	8593,96	24285,56	87857,22	12142,78	4296,48	5986,28	8
53	8602,76	24267,44	87866,28	12133,72	4300,88	5985,97	7
54	8611,57	24249,32	87875,34	12124,66	4305,28	5985,66	6
55	8620,39	24231,22	87884,39	12115,61	4309,69	5985,35	5
56	8629,21	24213,13	87893,43	12106,56	4314,11	5985,04	4
57	8638,04	24195,05	87902,47	12097,52	4318,52	5984,73	3
58	8646,87	24176,98	87911,51	12088,49	4322,94	5984,42	2
59	8655,70	24158,92	87920,54	12079,46	4327,36	5984,11	1
60	8664,55	24140,87	87929,56	12070,44	4331,78	5983,80	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

55 Degrees.

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.08663.55	0.24140.87	4.87929.56	0.12070.44	0.04331.78	4.95668.22	60
1	0.08672.40	0.24122.83	4.87938.58	0.12061.42	0.04336.20	4.95663.80	59
2	8681.25	24104.81	87947.59	12052.42	4340.68	5659.37	58
3	8690.11	24086.79	87956.60	12043.40	4345.06	5654.94	57
4	8698.98	24068.79	87965.61	12034.39	4349.49	5650.51	56
5	8707.85	24050.80	87974.60	12025.40	4353.93	5646.07	55
6	8716.72	24032.81	87983.59	12016.41	4358.36	5641.64	54
7	8725.60	24014.85	87992.57	12007.42	4362.80	5637.20	53
8	8734.49	23996.89	88001.55	11998.45	4367.25	5632.75	52
9	8743.38	23978.94	88010.53	11989.47	4371.69	5628.31	51
10	8752.28	23961.01	88019.49	11980.51	4376.14	5623.86	50
11	0.08761.18	0.23943.08	4.88028.46	0.11971.54	0.04380.59	4.95619.41	49
12	8770.09	23925.17	88037.41	11962.58	4380.05	5619.95	48
13	8779.01	23907.26	88046.37	11953.63	4389.51	5615.49	47
14	8787.93	23889.37	88055.31	11944.69	4398.96	5610.93	46
15	8796.85	23871.49	88064.25	11935.74	4398.43	5606.37	45
16	8805.78	23853.62	88072.19	11926.81	4402.86	5601.81	44
17	8814.72	23835.76	88082.12	11917.88	4407.39	5597.24	43
18	8823.66	23817.92	88091.04	11908.96	4411.83	5592.67	42
19	8832.61	23800.08	88099.96	11900.04	4416.31	5588.11	41
20	8841.56	23782.25	88108.87	11891.13	4420.78	5583.54	40
21	0.08350.52	0.23764.44	4.88117.78	0.11882.22	0.04445.26	4.95574.74	39
22	8850.49	23746.63	88126.68	11873.21	4429.75	5579.95	38
23	8859.43	23728.84	88135.58	11864.22	4434.23	5575.37	37
24	8868.37	23711.06	88144.47	11855.23	4438.72	5570.79	36
25	8877.31	23693.29	88153.35	11846.25	4443.20	5566.20	35
26	8886.25	23675.53	88162.23	11837.26	4447.70	5561.61	34
27	8895.19	23657.78	88171.11	11828.28	4452.19	5557.02	33
28	8904.13	23640.04	88179.98	11820.02	4456.69	5552.43	32
29	8913.07	23622.31	88188.84	11811.16	4461.19	5547.84	31
30	8922.01	23604.60	88197.70	11802.30	4465.70	5543.25	30
31	0.08949.41	0.23586.89	4.88206.54	0.11793.45	0.04470.21	4.95529.79	29
32	8949.43	23569.20	88215.40	11784.60	4474.71	5538.68	28
33	8958.45	23551.51	88224.44	11775.76	4479.23	5534.07	27
34	8967.49	23533.84	88233.08	11766.92	4483.74	5529.46	26
35	8976.52	23516.18	88241.91	11758.09	4488.26	5524.85	25
36	8985.56	23498.53	88250.73	11749.26	4492.78	5520.24	24
37	8994.61	23480.89	88259.55	11740.44	4497.31	5515.63	23
38	9003.66	23463.26	88268.37	11731.63	4501.83	5511.02	22
39	9012.72	23445.64	88277.18	11722.82	4506.36	5506.41	21
40	9022.79	23428.03	88285.98	11714.02	4510.89	5501.80	20
41	0.09030.85	0.23410.43	4.88294.78	0.11705.22	0.04515.43	4.95484.57	19
42	9039.93	23392.85	88303.57	11696.43	4519.96	5497.19	18
43	9049.01	23374.27	88312.36	11687.63	4524.51	5492.58	17
44	9058.10	23357.71	88321.14	11678.86	4529.05	5487.97	16
45	9067.19	23340.15	88329.92	11670.07	4533.59	5483.36	15
46	9076.29	23322.61	88338.69	11661.31	4538.15	5478.75	14
47	9085.39	23305.08	88347.46	11652.54	4542.69	5474.14	13
48	9094.50	23287.56	88356.22	11643.78	4547.25	5469.53	12
49	9103.61	23270.04	88364.98	11635.02	4551.80	5464.92	11
50	9112.73	23252.54	88373.73	11626.27	4556.36	5460.31	10
51	0.09121.86	0.23235.06	4.88382.47	0.11617.53	0.04560.93	4.95439.07	9
52	9130.99	23217.58	88391.21	11608.79	4560.50	5455.70	8
53	9140.12	23200.11	88399.94	11600.06	4570.06	5451.09	7
54	9149.27	23182.65	88408.67	11591.32	4574.64	5446.48	6
55	9158.41	23165.20	88417.40	11582.60	4579.20	5441.87	5
56	9167.57	23147.77	88426.11	11573.88	4583.79	5437.26	4
57	9176.73	23130.34	88434.83	11565.17	4588.37	5432.65	3
58	9185.80	23112.93	88443.53	11556.47	4592.94	5428.04	2
59	9194.86	23095.52	88452.24	11547.76	4597.52	5423.43	1
60	9204.24	23078.13	88460.93	11539.07	4602.12	5418.82	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.99204.24	0.23078.13	88455.93	0.11539.07	0.04609.11	4.95397.58	60
1	0.99213.22	0.23060.73	88464.62	0.11530.38	0.04606.71	4.95393.99	59
2	0.99222.60	0.23043.39	88473.31	0.11521.69	0.04604.30	4.95389.20	58
3	0.99231.80	0.23026.01	88481.99	0.11513.01	0.04601.90	4.95384.10	57
4	0.99240.99	0.23008.66	88490.67	0.11504.33	0.04599.50	4.95379.56	56
5	0.99250.20	0.22991.32	88499.34	0.11495.66	0.04597.10	4.95374.99	55
6	0.99259.41	0.22973.99	88508.00	0.11486.99	0.04594.71	4.95370.29	54
7	0.99268.62	0.22956.68	88516.66	0.11478.34	0.04592.31	4.95365.60	53
8	0.99277.84	0.22939.37	88525.31	0.11469.68	0.04589.92	4.95360.82	52
9	0.99287.07	0.22922.07	88533.96	0.11461.04	0.04587.54	4.95356.06	51
10	0.99296.30	0.22904.78	88542.61	0.11452.39	0.04585.15	4.95351.25	50
11	0.99305.54	0.22887.51	88551.24	0.11443.76	0.04582.77	4.95346.40	49
12	0.99314.78	0.22870.24	88559.88	0.11435.12	0.04580.40	4.95341.52	48
13	0.99324.03	0.22852.98	88568.51	0.11426.49	0.04578.02	4.95336.61	47
14	0.99333.29	0.22835.74	88577.13	0.11417.87	0.04575.64	4.95331.68	46
15	0.99342.55	0.22818.50	88585.75	0.11409.26	0.04573.27	4.95326.72	45
16	0.99351.81	0.22801.28	88594.36	0.11400.64	0.04570.91	4.95321.74	44
17	0.99361.08	0.22784.07	88602.96	0.11392.04	0.04568.54	4.95316.74	43
18	0.99370.36	0.22766.86	88611.57	0.11383.43	0.04566.18	4.95311.72	42
19	0.99379.64	0.22749.67	88620.16	0.11374.84	0.04563.82	4.95306.68	41
20	0.99388.93	0.22732.49	88628.75	0.11366.25	0.04561.46	4.95301.62	40
21	0.99398.23	0.22715.32	88637.34	0.11357.66	0.04559.12	4.95296.54	39
22	0.99407.53	0.22698.15	88645.92	0.11349.08	0.04556.78	4.95291.44	38
23	0.99416.83	0.22680.99	88654.50	0.11340.50	0.04554.44	4.95286.32	37
24	0.99426.14	0.22663.86	88663.07	0.11331.93	0.04552.10	4.95281.18	36
25	0.99435.46	0.22646.73	88671.63	0.11323.36	0.04549.77	4.95276.02	35
26	0.99444.78	0.22629.61	88680.19	0.11314.81	0.04547.43	4.95270.84	34
27	0.99454.11	0.22612.51	88688.74	0.11306.26	0.04545.10	4.95265.64	33
28	0.99463.44	0.22595.41	88697.29	0.11297.71	0.04542.77	4.95260.42	32
29	0.99472.78	0.22578.32	88705.84	0.11289.16	0.04540.44	4.95255.18	31
30	0.99482.13	0.22561.24	88714.38	0.11280.62	0.04538.12	4.95250.00	30
31	0.99491.48	0.22544.17	88722.91	0.11272.09	0.04535.79	4.95244.79	29
32	0.99500.84	0.22527.12	88731.44	0.11263.56	0.04533.46	4.95239.56	28
33	0.99510.20	0.22510.07	88740.00	0.11255.04	0.04531.14	4.95234.32	27
34	0.99519.57	0.22492.93	88748.48	0.11246.52	0.04528.82	4.95229.07	26
35	0.99528.94	0.22475.81	88756.99	0.11238.01	0.04526.50	4.95223.80	25
36	0.99538.32	0.22458.69	88765.50	0.11229.50	0.04524.18	4.95218.52	24
37	0.99547.70	0.22441.59	88774.00	0.11221.00	0.04521.86	4.95213.22	23
38	0.99557.09	0.22424.49	88782.50	0.11212.50	0.04519.55	4.95207.90	22
39	0.99566.49	0.22407.40	88791.00	0.11204.01	0.04517.24	4.95202.56	21
40	0.99575.89	0.22391.03	88800.48	0.11195.51	0.04514.94	4.95197.20	20
41	0.99585.30	0.22374.07	88809.96	0.11187.04	0.04512.65	4.95191.82	19
42	0.99594.71	0.22357.11	88819.44	0.11178.56	0.04510.36	4.95186.42	18
43	0.99604.13	0.22340.17	88828.91	0.11170.09	0.04508.07	4.95181.00	17
44	0.99613.56	0.22323.24	88838.38	0.11161.62	0.04505.78	4.95175.56	16
45	0.99622.99	0.22306.31	88846.84	0.11153.15	0.04503.49	4.95170.11	15
46	0.99632.43	0.22289.40	88855.30	0.11144.70	0.04501.20	4.95164.64	14
47	0.99641.87	0.22272.50	88863.75	0.11136.25	0.04498.91	4.95159.16	13
48	0.99651.32	0.22255.61	88872.19	0.11127.81	0.04496.62	4.95153.66	12
49	0.99660.77	0.22238.72	88880.64	0.11119.36	0.04494.33	4.95148.14	11
50	0.99670.23	0.22221.85	88889.07	0.11110.92	0.04492.04	4.95142.60	10
51	0.99679.69	0.22204.99	88897.50	0.11102.49	0.04489.75	4.95137.04	9
52	0.99689.16	0.22188.14	88905.93	0.11094.07	0.04487.46	4.95131.46	8
53	0.99698.64	0.22171.30	88914.35	0.11085.65	0.04485.17	4.95125.86	7
54	0.99708.12	0.22154.47	88922.76	0.11077.23	0.04482.88	4.95120.24	6
55	0.99717.61	0.22137.65	88931.17	0.11068.83	0.04480.59	4.95114.60	5
56	0.99727.11	0.22120.82	88939.58	0.11060.42	0.04478.30	4.95108.94	4
57	0.99736.61	0.22104.04	88947.98	0.11052.02	0.04476.01	4.95103.26	3
58	0.99746.11	0.22087.25	88956.38	0.11043.62	0.04473.72	4.95097.56	2
59	0.99755.62	0.22070.47	88964.76	0.11035.24	0.04471.43	4.95091.84	1
60	0.99765.14	0.22053.70	88973.15	0.11026.85	0.04469.14	4.95086.10	0
M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cofec.	M

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.09765,14	0.22053,70	4.88973,15	0.11026,82	0.04882,67	4.95117,43	60
1	0.09774,66	0.22053,94	4.88981,53	0.11018,44	0.04887,33	4.95112,67	59
2	0.09784,19	22020,19	88989,90	11016,10	4892,10	5107,90	58
3	0.09793,72	22008,45	88998,22	11001,72	4896,86	5103,14	57
4	0.09803,26	21986,72	89006,64	10993,36	4901,63	5098,37	56
5	0.09812,81	21970,00	89015,00	10985,00	4906,41	5093,59	55
6	0.09822,36	21953,29	89023,35	10976,64	4911,18	5088,82	54
7	0.09831,92	21936,59	89031,70	10968,30	4915,96	5084,04	53
8	0.09841,48	21919,90	89040,05	10959,95	4920,74	5079,26	52
9	0.09851,05	21903,23	89048,38	10951,62	4925,52	5074,47	51
10	0.09860,62	21886,56	89056,72	10943,28	4930,31	5070,69	50
11	0.09870,20	0.21869,90	4.89065,05	0.10934,95	0.04935,10	4.95064,90	49
12	0.09879,79	21853,25	89073,38	10926,62	4939,89	5060,10	48
13	0.09889,38	21836,61	89081,69	10918,30	4944,69	5055,31	47
14	0.09898,98	21819,98	89090,01	10909,99	4949,49	5050,51	46
15	0.09908,58	21803,36	89098,32	10901,68	4954,29	5045,71	45
16	0.09918,19	21786,76	89106,62	10893,38	4959,10	5040,90	44
17	0.09927,81	21770,16	89114,92	10885,08	4963,91	5036,09	43
18	0.09937,42	21753,57	89123,21	10876,79	4968,72	5031,28	42
19	0.09947,06	21736,99	89131,50	10868,49	4973,53	5026,47	41
20	0.09956,69	21720,42	89139,79	10860,21	4978,34	5021,66	40
21	0.09966,33	0.21703,86	4.89148,07	0.10851,93	0.04983,17	4.95016,83	39
22	0.09975,97	21687,32	89156,34	10843,66	4987,98	5012,01	38
23	0.09985,62	21670,78	89164,61	10835,39	4992,81	5007,19	37
24	0.09995,28	21654,25	89172,87	10827,13	4997,64	5002,36	36
25	1.00004,94	21637,73	89181,13	10818,86	5002,47	4997,53	35
26	1.00014,61	21621,22	89189,39	10810,61	5007,31	4992,69	34
27	1.00024,28	21604,72	89197,64	10802,36	5012,14	4987,86	33
28	1.00033,96	21588,23	89205,88	10794,11	5016,98	4983,02	32
29	1.00043,64	21571,76	89214,12	10785,88	5021,82	4978,18	31
30	1.00053,33	21555,29	89222,35	10777,65	5026,66	4973,33	30
31	0.10063,03	0.21538,83	4.89230,58	0.10769,42	0.05031,52	4.94968,48	29
32	1.00072,73	21522,38	89238,81	10761,19	5036,36	4968,33	28
33	1.00082,44	21505,94	89247,03	10752,97	5041,22	4963,48	27
34	1.00092,16	21489,51	89255,24	10744,76	5046,08	4958,62	26
35	1.0101,88	21473,09	89263,45	10736,55	5050,94	4953,76	25
36	1.0111,60	21456,68	89271,66	10728,34	5055,80	4948,90	24
37	1.0121,33	21440,28	89279,86	10720,14	5060,68	4944,02	23
38	1.0131,07	21423,89	89288,05	10711,94	5065,54	4939,13	22
39	1.0140,81	21407,51	89296,24	10703,75	5070,41	4934,25	21
40	1.0150,56	21391,14	89304,43	10695,57	5075,28	4929,36	20
41	0.10160,32	0.21374,78	4.89312,61	0.10687,39	0.05080,16	4.94919,84	19
42	1.0170,08	21358,43	89320,78	10679,22	5080,04	4914,06	18
43	1.0179,82	21342,09	89328,95	10671,04	5084,92	4909,17	17
44	1.0189,58	21325,76	89337,12	10662,83	5089,81	4904,27	16
45	1.0199,40	21309,44	89345,28	10654,72	5094,70	4900,30	15
46	1.0209,18	21293,13	89353,43	10646,57	5104,59	4895,41	14
47	1.0218,97	21276,83	89361,58	10638,41	5100,48	4890,51	13
48	1.0228,77	21260,54	89369,73	10630,27	5114,39	4885,61	12
49	1.0238,57	21244,26	89377,87	10622,13	5119,29	4880,71	11
50	1.0248,38	21227,98	89386,01	10613,99	5124,19	4875,81	10
51	0.10258,19	0.21211,72	4.89394,14	0.10605,86	0.05124,10	4.94870,90	9
52	1.0268,01	21195,47	89402,26	10597,74	5134,01	4870,99	8
53	1.0277,84	21179,23	89410,38	10589,62	5138,92	4866,08	7
54	1.0287,67	21162,99	89419,50	10581,50	5143,83	4861,16	6
55	1.0297,51	21146,77	89428,61	10573,38	5148,75	4856,24	5
56	1.0307,35	21130,56	89437,72	10565,28	5153,67	4851,32	4
57	1.0317,20	21114,36	89446,82	10557,18	5158,60	4846,40	3
58	1.0327,06	21098,16	89455,92	10549,08	5163,53	4841,48	2
59	1.0336,92	21081,98	89465,02	10540,99	5168,46	4836,57	1
60	1.0346,79	21065,80	89474,10	10532,90	5173,40	4831,60	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof. M
0	10346.79	0.2466.80	4.89467.10	0.10332.90	0.05173.30	4.94826.60
1	10336.66	0.2409.64	4.89475.18	0.10334.88	0.05118.33	4.94831.67
2	10326.54	0.2353.48	4.89483.26	0.10336.74	0.05183.27	4.94836.73
3	10316.42	0.2297.34	4.89491.33	0.10338.67	0.05188.21	4.94841.79
4	10306.31	0.2241.20	4.89499.40	0.10340.60	0.05193.14	4.94846.84
5	10296.21	0.2185.07	4.89507.46	0.10342.53	0.05198.11	4.94851.89
6	10286.11	0.2128.96	4.89515.52	0.10344.48	0.05203.06	4.94856.94
7	10276.02	0.2072.86	4.89523.57	0.10346.43	0.05208.01	4.94861.99
8	10265.94	0.2016.76	4.89531.62	0.10348.38	0.05212.97	4.94867.03
9	10255.86	0.1960.67	4.89539.66	0.10350.34	0.05217.93	4.94872.07
10	10245.78	0.1904.59	4.89547.73	0.10352.29	0.05222.89	4.94877.11
11	10235.71	0.1848.52	4.89555.74	0.10354.26	0.05227.86	4.94882.14
12	10225.65	0.1792.46	4.89563.77	0.10356.23	0.05232.83	4.94887.17
13	10215.60	0.1836.41	4.89571.79	0.10358.21	0.05237.80	4.94892.20
14	10205.55	0.1880.37	4.89579.81	0.10360.19	0.05242.77	4.94897.22
15	10195.50	0.1824.34	4.89587.83	0.10362.17	0.05247.75	4.94902.25
16	10185.47	0.1868.32	4.89595.84	0.10364.16	0.05252.74	4.94907.26
17	10175.43	0.1912.31	4.89603.84	0.10366.15	0.05257.72	4.94912.28
18	10165.41	0.1956.31	4.89611.84	0.10368.15	0.05262.71	4.94917.29
19	10155.39	0.2000.32	4.89619.84	0.10370.16	0.05267.69	4.94922.30
20	10145.37	0.2044.34	4.89627.83	0.10372.17	0.05272.69	4.94927.31
21	10135.37	0.2088.37	4.89634.81	0.10374.19	0.05277.69	4.94932.31
22	10125.36	0.2132.40	4.89643.80	0.10376.20	0.05282.68	4.94937.32
23	10115.37	0.2176.45	4.89651.77	0.10378.23	0.05287.69	4.94942.31
24	10105.38	0.2220.51	4.89659.74	0.10380.26	0.05292.69	4.94947.31
25	10095.39	0.2264.57	4.89667.71	0.10382.29	0.05297.69	4.94952.30
26	10085.42	0.2308.65	4.89675.67	0.10384.32	0.05302.71	4.94957.29
27	10075.44	0.2352.73	4.89683.63	0.10386.37	0.05307.72	4.94962.28
28	10065.48	0.2396.83	4.89691.58	0.10388.42	0.05312.74	4.94967.26
29	10055.52	0.2440.93	4.89699.53	0.10390.47	0.05317.76	4.94972.24
30	10045.56	0.2485.04	4.89707.48	0.10392.52	0.05322.78	4.94977.22
31	10035.61	0.2529.17	4.89715.41	0.10394.58	0.05327.81	4.94982.19
32	10025.67	0.2573.30	4.89723.35	0.10396.65	0.05332.84	4.94987.16
33	10015.74	0.2617.44	4.89731.28	0.10398.72	0.05337.87	4.94992.13
34	10005.81	0.2661.59	4.89739.20	0.10400.80	0.05342.91	4.94997.09
35	10095.88	0.2705.75	4.89747.12	0.10402.87	0.05347.94	4.95002.06
36	10085.96	0.2749.92	4.89755.04	0.10404.96	0.05352.98	4.95007.02
37	10076.05	0.2794.10	4.89762.95	0.10407.05	0.05358.03	4.95011.97
38	10066.15	0.2838.29	4.89770.85	0.10409.15	0.05363.08	4.95016.92
39	10056.25	0.2882.49	4.89778.75	0.10411.25	0.05368.13	4.95021.87
40	10046.35	0.2926.70	4.89786.65	0.10413.35	0.05373.18	4.95026.82
41	10036.46	0.2970.91	4.89794.54	0.10415.45	0.05378.23	4.95031.77
42	10026.58	0.3015.14	4.89802.43	0.10417.57	0.05383.29	4.95036.71
43	10016.71	0.3059.38	4.89810.31	0.10419.69	0.05388.36	4.95041.64
44	10006.84	0.3103.62	4.89818.19	0.10421.81	0.05393.42	4.95046.58
45	10096.97	0.3147.88	4.89826.06	0.10423.94	0.05398.49	4.95051.51
46	10087.11	0.3192.14	4.89833.93	0.10426.07	0.05403.56	4.95056.44
47	10077.26	0.3236.41	4.89841.79	0.10428.21	0.05408.63	4.95061.37
48	10067.42	0.3280.70	4.89849.65	0.10430.35	0.05413.71	4.95066.29
49	10057.58	0.3324.99	4.89857.50	0.10432.50	0.05418.79	4.95071.21
50	10047.74	0.3369.29	4.89865.35	0.10434.64	0.05423.87	4.95076.13
51	10037.92	0.3413.60	4.89873.20	0.10436.80	0.05428.96	4.95081.04
52	10028.10	0.3457.92	4.89881.04	0.10438.96	0.05434.04	4.95085.95
53	10018.28	0.3502.25	4.89888.87	0.10441.13	0.05439.14	4.95090.86
54	10008.47	0.3546.59	4.89896.70	0.10443.29	0.05444.24	4.95095.76
55	10098.67	0.3590.94	4.89904.53	0.10445.47	0.05449.34	4.95100.66
56	10088.87	0.3635.30	4.89912.35	0.10447.65	0.05454.44	4.95105.56
57	10079.08	0.3679.66	4.89920.17	0.10449.83	0.05459.54	4.95110.46
58	10069.29	0.3724.04	4.89927.98	0.10452.02	0.05464.65	4.95115.35
59	10059.51	0.3768.42	4.89935.79	0.10454.21	0.05469.75	4.95120.25
60	10049.74	0.3812.82	4.89943.59	0.10456.41	0.05474.87	4.95125.15
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines. M

30 Degrees.

M	Secants.	Cosecants.	Half Sines.	Half Cosecs.	Half Sec.	Half Cot.	M
0	0.100000	0.101118	0.100000	0.100000	0.101118	0.101118	1
1	0.100000	0.100071	0.099911	0.100000	0.101118	0.101118	2
2	0.100000	0.100046	0.099886	0.100000	0.101118	0.101118	3
3	0.100000	0.100021	0.099861	0.100000	0.101118	0.101118	4
4	0.100000	0.100000	0.099836	0.100000	0.101118	0.101118	5
5	0.100000	0.100000	0.099811	0.100000	0.101118	0.101118	6
6	0.100000	0.100000	0.099786	0.100000	0.101118	0.101118	7
7	0.100000	0.100000	0.099761	0.100000	0.101118	0.101118	8
8	0.100000	0.100000	0.099736	0.100000	0.101118	0.101118	9
9	0.100000	0.100000	0.099711	0.100000	0.101118	0.101118	10
11	0.100000	0.100000	0.099686	0.100000	0.101118	0.101118	11
12	0.100000	0.100000	0.099661	0.100000	0.101118	0.101118	12
13	0.100000	0.100000	0.099636	0.100000	0.101118	0.101118	13
14	0.100000	0.100000	0.099611	0.100000	0.101118	0.101118	14
15	0.100000	0.100000	0.099586	0.100000	0.101118	0.101118	15
16	0.100000	0.100000	0.099561	0.100000	0.101118	0.101118	16
17	0.100000	0.100000	0.099536	0.100000	0.101118	0.101118	17
18	0.100000	0.100000	0.099511	0.100000	0.101118	0.101118	18
19	0.100000	0.100000	0.099486	0.100000	0.101118	0.101118	19
20	0.100000	0.100000	0.099461	0.100000	0.101118	0.101118	20
21	0.100000	0.100000	0.099436	0.100000	0.101118	0.101118	21
22	0.100000	0.100000	0.099411	0.100000	0.101118	0.101118	22
23	0.100000	0.100000	0.099386	0.100000	0.101118	0.101118	23
24	0.100000	0.100000	0.099361	0.100000	0.101118	0.101118	24
25	0.100000	0.100000	0.099336	0.100000	0.101118	0.101118	25
26	0.100000	0.100000	0.099311	0.100000	0.101118	0.101118	26
27	0.100000	0.100000	0.099286	0.100000	0.101118	0.101118	27
28	0.100000	0.100000	0.099261	0.100000	0.101118	0.101118	28
29	0.100000	0.100000	0.099236	0.100000	0.101118	0.101118	29
30	0.100000	0.100000	0.099211	0.100000	0.101118	0.101118	30
31	0.100000	0.100000	0.099186	0.100000	0.101118	0.101118	31
32	0.100000	0.100000	0.099161	0.100000	0.101118	0.101118	32
33	0.100000	0.100000	0.099136	0.100000	0.101118	0.101118	33
34	0.100000	0.100000	0.099111	0.100000	0.101118	0.101118	34
35	0.100000	0.100000	0.099086	0.100000	0.101118	0.101118	35
36	0.100000	0.100000	0.099061	0.100000	0.101118	0.101118	36
37	0.100000	0.100000	0.099036	0.100000	0.101118	0.101118	37
38	0.100000	0.100000	0.099011	0.100000	0.101118	0.101118	38
39	0.100000	0.100000	0.098986	0.100000	0.101118	0.101118	39
40	0.100000	0.100000	0.098961	0.100000	0.101118	0.101118	40
41	0.100000	0.100000	0.098936	0.100000	0.101118	0.101118	41
42	0.100000	0.100000	0.098911	0.100000	0.101118	0.101118	42
43	0.100000	0.100000	0.098886	0.100000	0.101118	0.101118	43
44	0.100000	0.100000	0.098861	0.100000	0.101118	0.101118	44
45	0.100000	0.100000	0.098836	0.100000	0.101118	0.101118	45
46	0.100000	0.100000	0.098811	0.100000	0.101118	0.101118	46
47	0.100000	0.100000	0.098786	0.100000	0.101118	0.101118	47
48	0.100000	0.100000	0.098761	0.100000	0.101118	0.101118	48
49	0.100000	0.100000	0.098736	0.100000	0.101118	0.101118	49
50	0.100000	0.100000	0.098711	0.100000	0.101118	0.101118	50
51	0.100000	0.100000	0.098686	0.100000	0.101118	0.101118	51
52	0.100000	0.100000	0.098661	0.100000	0.101118	0.101118	52
53	0.100000	0.100000	0.098636	0.100000	0.101118	0.101118	53
54	0.100000	0.100000	0.098611	0.100000	0.101118	0.101118	54
55	0.100000	0.100000	0.098586	0.100000	0.101118	0.101118	55
56	0.100000	0.100000	0.098561	0.100000	0.101118	0.101118	56
57	0.100000	0.100000	0.098536	0.100000	0.101118	0.101118	57
58	0.100000	0.100000	0.098511	0.100000	0.101118	0.101118	58
59	0.100000	0.100000	0.098486	0.100000	0.101118	0.101118	59
60	0.100000	0.100000	0.098461	0.100000	0.101118	0.101118	60
M	Cosecants.	Secants.	Half Cos.	Half Sec.	Half Tan.	Half Cot.	M

50 Degrees.

M	Secant	Cotangent	Half Sin.	Half Cos.	Half Sec.	Half Cot.	M
0	0.11704,60	0.19093,75	4.90402,37	0.09396,67	0.05787,30	4.94112,70	60
1	0.11705,21	0.19093,80	4.90410,40	0.09389,60	0.05792,51	4.94107,89	59
2	0.11705,82	0.19093,86	4.90418,43	0.09381,58	0.05797,91	4.94103,09	58
3	0.11706,43	0.19093,92	4.90426,46	0.09374,06	0.05802,91	4.94098,28	57
4	0.11707,04	0.19093,98	4.90434,49	0.09366,55	0.05808,38	4.94093,47	56
5	0.11707,65	0.19094,04	4.90442,52	0.09359,04	0.05813,84	4.94088,66	55
6	0.11708,26	0.19094,10	4.90450,55	0.09351,53	0.05819,16	4.94083,85	54
7	0.11708,87	0.19094,16	4.90458,58	0.09344,02	0.05824,48	4.94078,99	53
8	0.11709,48	0.19094,22	4.90466,61	0.09336,51	0.05829,81	4.94074,18	52
9	0.11710,09	0.19094,28	4.90474,64	0.09329,00	0.05835,13	4.94069,37	51
10	0.11710,70	0.19094,34	4.90482,67	0.09321,49	0.05840,46	4.94064,56	50
11	0.11711,31	0.19094,40	4.90490,70	0.09314,00	0.05845,80	4.94059,75	49
12	0.11711,92	0.19094,46	4.90498,73	0.09306,49	0.05851,13	4.94054,94	48
13	0.11712,53	0.19094,52	4.90506,76	0.09299,00	0.05856,47	4.94050,13	47
14	0.11713,14	0.19094,58	4.90514,79	0.09291,49	0.05861,81	4.94045,32	46
15	0.11713,75	0.19094,64	4.90522,82	0.09284,00	0.05867,16	4.94040,51	45
16	0.11714,36	0.19094,70	4.90530,85	0.09276,49	0.05872,51	4.94035,70	44
17	0.11714,97	0.19094,76	4.90538,88	0.09269,00	0.05877,86	4.94030,89	43
18	0.11715,58	0.19094,82	4.90546,91	0.09261,49	0.05883,22	4.94026,08	42
19	0.11716,19	0.19094,88	4.90554,94	0.09254,00	0.05888,58	4.94021,27	41
20	0.11716,80	0.19094,94	4.90562,97	0.09246,49	0.05893,94	4.94016,46	40
21	0.11717,41	0.19095,00	4.90570,00	0.09239,00	0.05899,30	4.94011,65	39
22	0.11718,02	0.19095,06	4.90578,03	0.09231,49	0.05904,67	4.94006,84	38
23	0.11718,63	0.19095,12	4.90586,06	0.09224,00	0.05910,04	4.94002,03	37
24	0.11719,24	0.19095,18	4.90594,09	0.09216,49	0.05915,41	4.94000,22	36
25	0.11719,85	0.19095,24	4.90602,12	0.09209,00	0.05920,79	4.94000,41	35
26	0.11720,46	0.19095,30	4.90610,15	0.09201,49	0.05926,17	4.94000,60	34
27	0.11721,07	0.19095,36	4.90618,18	0.09194,00	0.05931,56	4.94000,79	33
28	0.11721,68	0.19095,42	4.90626,21	0.09186,49	0.05936,94	4.94000,98	32
29	0.11722,29	0.19095,48	4.90634,24	0.09179,00	0.05942,33	4.94001,17	31
30	0.11722,90	0.19095,54	4.90642,27	0.09171,49	0.05947,72	4.94001,36	30
31	0.11723,51	0.19095,60	4.90650,30	0.09164,00	0.05953,12	4.94001,55	29
32	0.11724,12	0.19095,66	4.90658,33	0.09156,49	0.05958,52	4.94001,74	28
33	0.11724,73	0.19095,72	4.90666,36	0.09149,00	0.05963,93	4.94001,93	27
34	0.11725,34	0.19095,78	4.90674,39	0.09141,49	0.05969,34	4.94002,12	26
35	0.11725,95	0.19095,84	4.90682,42	0.09134,00	0.05974,75	4.94002,31	25
36	0.11726,56	0.19095,90	4.90690,45	0.09126,49	0.05980,16	4.94002,50	24
37	0.11727,17	0.19095,96	4.90698,48	0.09119,00	0.05985,57	4.94002,69	23
38	0.11727,78	0.19096,02	4.90706,51	0.09111,49	0.05990,98	4.94002,88	22
39	0.11728,39	0.19096,08	4.90714,54	0.09104,00	0.05996,39	4.94003,07	21
40	0.11729,00	0.19096,14	4.90722,57	0.09096,49	0.06001,80	4.94003,26	20
41	0.11729,61	0.19096,20	4.90730,60	0.09089,00	0.06007,21	4.94003,45	19
42	0.11730,22	0.19096,26	4.90738,63	0.09081,49	0.06012,62	4.94003,64	18
43	0.11730,83	0.19096,32	4.90746,66	0.09074,00	0.06018,03	4.94003,83	17
44	0.11731,44	0.19096,38	4.90754,69	0.09066,49	0.06023,44	4.94004,02	16
45	0.11732,05	0.19096,44	4.90762,72	0.09059,00	0.06028,85	4.94004,21	15
46	0.11732,66	0.19096,50	4.90770,75	0.09051,49	0.06034,26	4.94004,40	14
47	0.11733,27	0.19096,56	4.90778,78	0.09044,00	0.06039,67	4.94004,59	13
48	0.11733,88	0.19096,62	4.90786,81	0.09036,49	0.06045,08	4.94004,78	12
49	0.11734,49	0.19096,68	4.90794,84	0.09029,00	0.06050,49	4.94004,97	11
50	0.11735,10	0.19096,74	4.90802,87	0.09021,49	0.06055,90	4.94005,16	10
51	0.11735,71	0.19096,80	4.90810,90	0.09014,00	0.06061,31	4.94005,35	9
52	0.11736,32	0.19096,86	4.90818,93	0.09006,49	0.06066,72	4.94005,54	8
53	0.11736,93	0.19096,92	4.90826,96	0.08999,00	0.06072,13	4.94005,73	7
54	0.11737,54	0.19096,98	4.90834,99	0.08991,49	0.06077,54	4.94005,92	6
55	0.11738,15	0.19097,04	4.90842,02	0.08984,00	0.06082,95	4.94006,11	5
56	0.11738,76	0.19097,10	4.90850,05	0.08976,49	0.06088,36	4.94006,30	4
57	0.11739,37	0.19097,16	4.90858,08	0.08969,00	0.06093,77	4.94006,49	3
58	0.11739,98	0.19097,22	4.90866,11	0.08961,49	0.06099,18	4.94006,68	2
59	0.11740,59	0.19097,28	4.90874,14	0.08954,00	0.06104,59	4.94006,87	1
60	0.11741,20	0.19097,34	4.90882,17	0.08946,49	0.06110,00	4.94007,06	0
M	Cotangent	Secant	Half Cos.	Half Sin.	Half Cot.	Half Sines.	M

M	Secants.	Cofecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.12222,01	0.18905,71	4.90847,14	0.09152,86	0.06111,01	4.93888,99	60
1	0.12233,00	0.18891,18	4.90854,41	0.09145,59	0.06116,50	4.93883,50	59
2	12243,99	18876,66	90861,67	9138,33	6121,49	3878,00	58
3	12254,99	18862,65	90868,92	9131,08	6127,49	3872,50	57
4	12265,99	18847,65	90876,17	9123,83	6132,99	3867,00	56
5	12277,00	18833,15	90883,42	9116,57	6138,50	3861,50	55
6	12288,02	18818,67	90890,66	9109,34	6144,01	3856,00	54
7	12299,04	18804,19	90897,90	9102,09	6149,52	3850,48	53
8	12310,07	18789,72	90905,14	9094,86	6155,04	3844,96	52
9	12321,11	18775,26	90912,37	9087,63	6160,56	3839,44	51
10	12332,15	18760,81	90919,59	9080,41	6166,08	3833,92	50
11	0.12343,20	0.18746,36	4.90926,82	0.09073,18	0.06171,60	4.93883,40	49
12	12354,26	18731,93	90934,03	9065,97	6177,13	3828,87	48
13	12365,26	18717,50	90941,25	9058,75	6182,66	3823,34	47
14	12376,39	18703,08	90948,46	9051,54	6188,19	3817,80	46
15	12387,47	18688,67	90955,61	9044,34	6193,72	3812,26	45
16	12398,55	18674,27	90962,86	9037,14	6199,28	3806,74	44
17	12409,64	18659,88	90970,06	9029,94	6204,82	3801,21	43
18	12420,73	18645,50	90977,25	9022,75	6210,37	3795,68	42
19	12431,84	18631,12	90984,44	9015,56	6215,92	3790,14	41
20	12442,94	18616,75	90991,62	9008,38	6221,47	3784,60	40
21	0.12454,06	0.18602,39	4.90998,80	0.09001,20	0.06227,03	4.93877,97	39
22	12465,18	17588,04	91005,98	8994,02	6227,59	3779,07	38
23	12476,31	17573,70	91013,15	8986,85	6233,16	3773,54	37
24	12487,44	17559,37	91020,31	8979,68	6238,72	3768,00	36
25	12498,58	17545,04	91027,48	8972,52	6244,29	3762,46	35
26	12509,73	17530,73	91034,63	8965,37	6249,87	3756,92	34
27	12520,88	17516,42	91041,79	8958,21	6255,44	3751,38	33
28	12532,05	17502,12	91048,94	8951,06	6261,02	3745,84	32
29	12543,21	17487,83	91056,08	8943,92	6266,60	3740,30	31
30	12554,39	17473,54	91063,23	8936,77	6272,20	3734,76	30
31	0.12565,57	0.17459,27	4.91070,36	0.08929,64	0.06282,79	4.93871,71	29
32	12576,75	17445,00	91077,50	8929,50	6277,81	3729,22	28
33	12587,95	17430,74	91084,63	8922,37	6283,43	3723,68	27
34	12599,15	17416,49	91091,75	8915,25	6289,07	3718,14	26
35	12610,35	17402,25	91098,87	8908,13	6294,72	3712,60	25
36	12621,56	17388,02	91105,99	8901,01	6300,38	3707,06	24
37	12632,78	17373,79	91113,10	8893,90	6306,05	3701,52	23
38	12644,01	17359,58	91120,21	8886,79	6311,72	3695,98	22
39	12655,24	17345,37	91127,31	8879,68	6317,40	3690,44	21
40	12666,48	17331,17	91134,41	8872,59	6323,08	3684,90	20
41	0.12677,73	0.17316,98	4.91141,51	0.08853,49	0.06338,86	4.93866,13	19
42	12688,98	17302,79	91148,60	8865,40	6328,77	3679,36	18
43	12700,24	17288,62	91155,69	8858,31	6334,49	3673,82	17
44	12711,51	17274,45	91162,77	8851,23	6340,22	3668,28	16
45	12722,78	17260,29	91169,85	8844,15	6345,96	3662,74	15
46	12734,06	17246,14	91176,93	8837,07	6351,71	3657,20	14
47	12745,34	17232,00	91184,00	8830,00	6357,47	3651,66	13
48	12756,63	17217,87	91191,06	8822,92	6363,24	3646,12	12
49	12767,93	17203,74	91198,13	8815,84	6369,02	3640,58	11
50	12779,24	17189,63	91205,21	8808,76	6374,81	3635,04	10
51	0.12790,56	0.17175,52	4.91212,21	0.08787,76	0.06393,27	4.93860,42	9
52	12801,87	17161,42	91219,29	8801,67	6400,93	3629,50	8
53	12813,19	17147,33	91226,33	8794,60	6406,60	3623,96	7
54	12824,52	17133,24	91233,38	8787,52	6412,38	3618,42	6
55	12835,86	17119,17	91240,41	8780,45	6418,17	3612,88	5
56	12847,21	17105,10	91247,45	8773,38	6423,97	3607,34	4
57	12858,56	17091,04	91254,48	8766,31	6429,78	3601,80	3
58	12869,92	17076,99	91261,50	8759,25	6435,60	3596,26	2
59	12881,28	17062,95	91268,52	8752,18	6441,43	3590,72	1
60	12892,65	17048,91	91275,54	8745,12	6447,27	3585,18	0
M	Cofecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

42 Degrees.

43

M	Secants.	Cotangents.	Half Sines.	Half Cotes.	Half Sec.	Half Cof.	M
1	0.1292.65	0.17448.91	4.91375.54	0.08724.46	0.6446.33	4.93563.67	60
2	0.1294.03	0.17434.88	4.91282.56	0.08717.44	0.64452.02	4.93547.98	59
3	0.1295.42	0.17420.87	4.91189.56	0.08710.42	0.64437.71	4.93532.29	58
4	0.1296.81	0.17406.86	4.91096.57	0.08703.43	0.64423.41	4.93517.59	57
5	0.1298.21	0.17392.85	4.91003.57	0.08696.43	0.64409.11	4.93503.89	56
6	0.1299.61	0.17378.86	4.90910.57	0.08689.43	0.64394.81	4.93489.19	55
7	0.1301.02	0.17364.88	4.90817.56	0.08682.44	0.64380.51	4.93475.49	54
8	0.1302.44	0.17350.90	4.90724.55	0.08675.45	0.64366.22	4.93461.79	53
9	0.1303.87	0.17336.93	4.90631.53	0.08668.47	0.64351.92	4.93448.09	52
10	0.1305.30	0.17322.97	4.90538.51	0.08661.48	0.64337.63	4.93434.39	51
11	0.1306.74	0.17309.02	4.90445.49	0.08654.51	0.64323.37	4.93420.69	50
12	0.1308.18	0.17295.07	4.90352.46	0.08647.54	0.64309.09	4.93406.99	49
13	0.1309.63	0.17281.13	4.90259.43	0.08640.56	0.64294.81	4.93393.29	48
14	0.1311.09	0.17267.21	4.90166.39	0.08633.61	0.64280.55	4.93379.59	47
15	0.1312.55	0.17253.29	4.90073.35	0.08626.65	0.64266.28	4.93365.89	46
16	0.1314.43	0.17239.37	4.90080.31	0.08619.69	0.64252.02	4.93352.19	45
17	0.1316.31	0.17225.47	4.90087.26	0.08612.74	0.64237.76	4.93338.49	44
18	0.1318.21	0.17211.57	4.90094.21	0.08605.79	0.64223.50	4.93324.79	43
19	0.1319.98	0.17197.69	4.90101.15	0.08598.84	0.64209.24	4.93311.09	42
20	0.1321.49	0.17183.81	4.90108.09	0.08591.91	0.64194.99	4.93297.39	41
21	0.1323.00	0.17169.94	4.90115.03	0.08584.97	0.64180.75	4.93283.69	40
22	0.1324.52	0.17156.07	4.90121.96	0.08578.04	0.64166.50	4.93269.99	39
23	0.1326.04	0.17142.22	4.90128.89	0.08571.11	0.64152.26	4.93256.29	38
24	0.1327.58	0.17128.37	4.90135.81	0.08564.18	0.64138.02	4.93242.59	37
25	0.1329.12	0.17114.53	4.90142.73	0.08557.26	0.64123.78	4.93228.89	36
26	0.1330.66	0.17100.70	4.90149.65	0.08550.33	0.64109.54	4.93215.19	35
27	0.1332.21	0.17086.88	4.90156.56	0.08543.42	0.64095.30	4.93201.49	34
28	0.1333.77	0.17073.06	4.90163.47	0.08536.50	0.64081.06	4.93187.79	33
29	0.1335.34	0.17059.25	4.90170.37	0.08529.63	0.64066.82	4.93174.09	32
30	0.1336.91	0.17045.46	4.90177.27	0.08522.73	0.64052.58	4.93160.39	31
31	0.1338.49	0.17031.67	4.90184.16	0.08515.84	0.64038.34	4.93146.69	30
32	0.1340.08	0.17017.88	4.90191.06	0.08508.94	0.64024.10	4.93132.99	29
33	0.1341.67	0.17004.11	4.90197.94	0.08502.06	0.64009.86	4.93119.29	28
34	0.1343.27	0.16990.34	4.90204.83	0.08495.17	0.63995.62	4.93105.59	27
35	0.1344.88	0.16976.58	4.90211.71	0.08488.29	0.63981.38	4.93091.89	26
36	0.1346.49	0.16962.83	4.90218.58	0.08481.42	0.63967.14	4.93078.19	25
37	0.1348.11	0.16949.09	4.90225.45	0.08474.55	0.63952.90	4.93064.49	24
38	0.1349.74	0.16935.36	4.90232.32	0.08467.68	0.63938.66	4.93050.79	23
39	0.1351.37	0.16921.63	4.90239.18	0.08460.82	0.63924.42	4.93037.09	22
40	0.1353.01	0.16907.91	4.90246.04	0.08453.96	0.63910.18	4.93023.39	21
41	0.1354.66	0.16894.20	4.90252.90	0.08447.10	0.63895.94	4.93009.69	20
42	0.1356.31	0.16880.50	4.90259.75	0.08440.25	0.63881.70	4.92995.99	19
43	0.1357.97	0.16866.80	4.90266.60	0.08433.40	0.63867.46	4.92982.29	18
44	0.1359.64	0.16853.12	4.90273.44	0.08426.56	0.63853.22	4.92968.59	17
45	0.1361.32	0.16839.44	4.90280.28	0.08419.72	0.63839.00	4.92954.89	16
46	0.1363.00	0.16825.77	4.90287.11	0.08412.89	0.63824.78	4.92941.19	15
47	0.1364.69	0.16812.11	4.90293.94	0.08406.05	0.63810.56	4.92927.49	14
48	0.1366.38	0.16798.45	4.90300.77	0.08400.22	0.63796.34	4.92913.79	13
49	0.1368.08	0.16784.81	4.90307.59	0.08394.39	0.63782.12	4.92900.09	12
50	0.1369.79	0.16771.17	4.90314.41	0.08388.55	0.63767.90	4.92886.39	11
51	0.1371.51	0.16757.54	4.90321.23	0.08382.71	0.63753.68	4.92872.69	10
52	0.1373.23	0.16743.91	4.90328.04	0.08376.96	0.63739.46	4.92858.99	9
53	0.1374.96	0.16730.30	4.90334.85	0.08371.15	0.63725.24	4.92845.29	8
54	0.1376.69	0.16716.69	4.90341.65	0.08365.35	0.63711.02	4.92831.59	7
55	0.1378.44	0.16703.09	4.90348.45	0.08359.55	0.63696.80	4.92817.89	6
56	0.1380.19	0.16689.50	4.90355.25	0.08353.75	0.63682.58	4.92804.19	5
57	0.1381.94	0.16675.92	4.90362.04	0.08347.96	0.63668.36	4.92790.49	4
58	0.1383.71	0.16662.34	4.90368.83	0.08342.17	0.63654.14	4.92776.79	3
59	0.1385.48	0.16648.78	4.90375.61	0.08336.39	0.63639.92	4.92763.09	2
60	0.1387.25	0.16635.23	4.90382.39	0.08330.61	0.63625.70	4.92749.39	1
M	Cotangents.	Secants.	Half Cof.	Half Sec.	Half Cotes.	Half Sines.	M

47 Degrees.

M	Secants	Cosecants	Half Sines	Half Cosec.	Half Sines	Half Cosec.	M
0	1.18877,26	0.16621,67	4.91689,16	0.08310,84	0.06799,63	4.93266,37	60
1	1.18899,04	0.16608,12	4.91695,34	0.08304,66	0.06799,54	4.93200,48	59
2	1.18910,83	0.16594,59	4.91702,10	0.08297,90	0.06799,45	4.93134,58	58
3	1.18922,63	0.16581,06	4.91709,17	0.08290,68	0.06799,36	4.93068,68	57
4	1.18934,43	0.16567,54	4.91716,23	0.08283,77	0.06799,27	4.93002,78	56
5	1.18946,24	0.16554,03	4.91723,28	0.08276,02	0.06799,18	4.92936,88	55
6	1.18958,06	0.16540,52	4.91730,34	0.08269,26	0.06799,09	4.92870,97	54
7	1.18969,89	0.16527,03	4.91736,41	0.08262,52	0.06798,99	4.92804,05	53
8	1.18981,72	0.16513,54	4.91743,47	0.08255,77	0.06798,90	4.92738,14	52
9	1.18993,56	0.16500,06	4.91749,57	0.08249,03	0.06798,81	4.92672,22	51
10	1.18995,40	0.16486,59	4.91756,60	0.08242,30	0.06798,72	4.92606,30	50
11	1.18977,26	0.16473,12	4.91763,64	0.08235,56	0.06798,63	4.92540,39	49
12	1.18989,12	0.16459,67	4.91770,16	0.08228,84	0.06798,54	4.92474,48	48
13	1.18974,98	0.16446,22	4.91776,39	0.08222,11	0.06798,45	4.92408,57	47
14	1.18972,86	0.16432,78	4.91783,61	0.08215,39	0.06798,36	4.92342,66	46
15	1.18970,74	0.16419,34	4.91790,33	0.08208,67	0.06798,27	4.92276,75	45
16	1.18976,62	0.16405,92	4.91797,04	0.08202,96	0.06798,18	4.92210,84	44
17	1.18978,52	0.16392,50	4.91803,75	0.08196,25	0.06798,09	4.92144,93	43
18	1.18980,42	0.16379,09	4.91810,46	0.08189,54	0.06798,00	4.92078,02	42
19	1.18982,33	0.16365,69	4.91817,15	0.08183,83	0.06797,91	4.92012,11	41
20	1.18984,24	0.16352,29	4.91823,85	0.08177,13	0.06797,82	4.91946,20	40
21	0.18986,17	0.16338,91	4.91830,54	0.08170,46	0.06797,73	4.91880,29	39
22	1.18988,10	0.16325,58	4.91837,23	0.08163,77	0.06797,64	4.91814,38	38
23	1.18989,03	0.16312,16	4.91843,92	0.08157,08	0.06797,55	4.91748,47	37
24	1.18991,97	0.16298,79	4.91850,60	0.08150,40	0.06797,46	4.91682,56	36
25	1.18988,92	0.16285,44	4.91857,28	0.08143,72	0.06797,37	4.91616,65	35
26	1.18995,88	0.16272,09	4.91863,95	0.08137,05	0.06797,28	4.91550,74	34
27	1.18997,85	0.16258,75	4.91870,62	0.08130,38	0.06797,19	4.91484,83	33
28	1.18999,82	0.16245,42	4.91877,29	0.08123,72	0.06797,10	4.91418,92	32
29	1.18993,79	0.16232,10	4.91883,95	0.08117,06	0.06797,01	4.91352,01	31
30	1.18998,78	0.16218,78	4.91890,61	0.08110,39	0.06796,92	4.91286,10	30
31	0.18995,67	0.16205,47	4.91897,26	0.08103,74	0.06796,83	4.91220,19	29
32	1.18997,77	0.16192,17	4.91903,91	0.08097,09	0.06796,74	4.91154,28	28
33	1.18999,79	0.16178,88	4.91910,56	0.08090,44	0.06796,65	4.91088,37	27
34	1.18999,79	0.16165,59	4.91917,20	0.08083,79	0.06796,56	4.91022,46	26
35	1.19003,81	0.16152,31	4.91923,84	0.08077,16	0.06796,47	4.90956,55	25
36	1.19015,84	0.16139,04	4.91930,48	0.08070,52	0.06796,38	4.90890,64	24
37	1.19027,87	0.16125,78	4.91937,11	0.08063,89	0.06796,29	4.90824,73	23
38	1.19039,91	0.16112,53	4.91943,73	0.08057,27	0.06796,20	4.90758,82	22
39	1.19051,96	0.16099,28	4.91950,36	0.08050,64	0.06796,11	4.90692,91	21
40	1.19064,01	0.16086,04	4.91956,98	0.08043,92	0.06796,02	4.90626,00	20
41	0.19076,07	0.16072,81	4.91963,59	0.08037,41	0.06795,93	4.90560,09	19
42	1.19088,14	0.16059,59	4.91970,20	0.08030,80	0.06795,84	4.90494,18	18
43	1.19100,22	0.16046,37	4.91976,81	0.08023,19	0.06795,75	4.90428,27	17
44	1.19112,30	0.16033,16	4.91983,42	0.08016,58	0.06795,66	4.90362,36	16
45	1.19124,39	0.16019,96	4.91990,03	0.08009,98	0.06795,57	4.90296,45	15
46	1.19136,49	0.16006,77	4.91996,61	0.08003,38	0.06795,48	4.90230,54	14
47	1.19148,59	0.15993,58	4.92003,21	0.07996,79	0.06795,39	4.90164,63	13
48	1.19160,71	0.15980,41	4.92009,79	0.07990,21	0.06795,30	4.90098,72	12
49	1.19172,82	0.15967,24	4.92016,38	0.07983,62	0.06795,21	4.90032,81	11
50	1.19184,95	0.15954,07	4.92022,96	0.07977,04	0.06795,12	4.90000,00	10
51	0.19197,08	0.15940,92	4.92029,54	0.07970,46	0.06795,03	4.90000,00	9
52	1.19209,22	0.15927,77	4.92036,11	0.07963,88	0.06794,94	4.90000,00	8
53	1.19221,37	0.15914,63	4.92042,68	0.07957,32	0.06794,85	4.90000,00	7
54	1.19233,52	0.15901,50	4.92049,25	0.07950,75	0.06794,76	4.90000,00	6
55	1.19245,68	0.15888,38	4.92055,81	0.07944,19	0.06794,67	4.90000,00	5
56	1.19257,85	0.15875,26	4.92062,37	0.07937,63	0.06794,58	4.90000,00	4
57	1.19269,92	0.15862,15	4.92068,93	0.07931,08	0.06794,49	4.90000,00	3
58	1.19282,01	0.15849,05	4.92075,47	0.07924,53	0.06794,40	4.90000,00	2
59	1.19294,39	0.15835,96	4.92082,02	0.07917,98	0.06794,31	4.90000,00	1
60	1.19306,59	0.15822,87	4.92088,56	0.07911,44	0.06794,22	4.90000,00	0
M	Cosecants	Secants	Half Cosec.	Half Sec.	Half Cosec.	Half Sines	M

M	Secants.	Cotsecants.	Half Sines.	Half Cofec.	Half Sec.	Half Cof.	M
0	0.14306,59	0.15822,87	4.92088,56	0.07911,44	0.07153,30	4.92846,70	60
1	0.14318,79	0.15809,79	4.92095,10	0.07904,90	0.07159,39	4.92840,60	59
2	0.14331,00	0.15796,72	4.92101,64	0.07898,36	0.07165,50	4.92834,50	58
3	0.14343,22	0.15783,66	4.92108,17	0.07891,83	0.07171,61	4.92828,39	57
4	0.14355,45	0.15770,61	4.92114,69	0.07885,31	0.07177,72	4.92822,27	56
5	0.14367,68	0.15757,56	4.92121,22	0.07878,78	0.07183,84	4.92816,16	55
6	0.14379,92	0.15744,52	4.92127,74	0.07872,26	0.07189,96	4.92810,04	54
7	0.14392,16	0.15731,49	4.92134,25	0.07865,75	0.07196,08	4.92803,92	53
8	0.14404,42	0.15718,46	4.92140,77	0.07859,23	0.07202,21	4.92797,79	52
9	0.14416,68	0.15705,44	4.92147,28	0.07852,72	0.07208,34	4.92791,66	51
10	0.14428,94	0.15692,43	4.92153,78	0.07846,22	0.07214,47	4.92785,53	50
11	0.14441,22	0.15679,43	4.92160,28	0.07839,71	0.07220,61	4.92779,39	49
12	0.14453,50	0.15666,44	4.92166,78	0.07833,22	0.07226,75	4.92773,25	48
13	0.14465,79	0.15653,45	4.92173,27	0.07826,72	0.07232,90	4.92767,10	47
14	0.14478,08	0.15640,47	4.92179,76	0.07820,24	0.07239,04	4.92760,96	46
15	0.14490,39	0.15627,50	4.92186,25	0.07813,75	0.07245,19	4.92754,80	45
16	0.14502,70	0.15614,53	4.92192,73	0.07807,27	0.07251,35	4.92748,65	44
17	0.14515,01	0.15601,58	4.92199,21	0.07800,79	0.07257,55	4.92742,44	43
18	0.14527,34	0.15588,63	4.92205,68	0.07794,32	0.07263,67	4.92736,33	42
19	0.14539,67	0.15575,68	4.92212,16	0.07787,84	0.07269,84	4.92730,16	41
20	0.14552,01	0.15562,75	4.92218,62	0.07781,37	0.07276,01	4.92723,99	40
21	0.14564,36	0.15549,82	4.92225,09	0.07774,91	0.07282,18	4.92717,82	39
22	0.14576,71	0.15536,90	4.92231,55	0.07768,45	0.07288,35	4.92711,64	38
23	0.14589,07	0.15523,99	4.92238,00	0.07761,99	0.07294,53	4.92705,46	37
24	0.14601,44	0.15511,09	4.92244,45	0.07755,54	0.07300,72	4.92699,28	36
25	0.14613,81	0.15498,19	4.92250,90	0.07749,10	0.07306,91	4.92693,09	35
26	0.14626,19	0.15485,30	4.92257,35	0.07742,63	0.07313,10	4.92686,90	34
27	0.14638,58	0.15472,42	4.92263,79	0.07736,21	0.07319,29	4.92680,71	33
28	0.14650,98	0.15459,55	4.92270,22	0.07729,77	0.07325,49	4.92674,51	32
29	0.14663,38	0.15446,68	4.92276,66	0.07723,34	0.07331,69	4.92668,31	31
30	0.14675,75	0.15433,82	4.92283,09	0.07716,91	0.07337,89	4.92662,10	30
31	0.14688,21	0.15420,97	4.92289,51	0.07710,48	0.07344,11	4.92655,89	29
32	0.14700,66	0.15408,12	4.92295,94	0.07704,06	0.07350,32	4.92649,68	28
33	0.14713,07	0.15395,29	4.92302,35	0.07697,64	0.07356,53	4.92643,46	27
34	0.14725,51	0.15382,46	4.92308,77	0.07691,23	0.07362,76	4.92637,24	26
35	0.14737,96	0.15369,64	4.92315,18	0.07684,82	0.07368,98	4.92631,02	25
36	0.14750,41	0.15356,82	4.92321,59	0.07678,41	0.07375,21	4.92624,79	24
37	0.14762,87	0.15344,01	4.92327,99	0.07672,01	0.07381,44	4.92618,56	23
38	0.14775,34	0.15331,21	4.92334,39	0.07665,61	0.07387,67	4.92612,33	22
39	0.14787,82	0.15318,42	4.92340,79	0.07659,21	0.07393,91	4.92606,09	21
40	0.14800,30	0.15305,64	4.92347,18	0.07652,81	0.07400,25	4.92599,85	20
41	0.14812,79	0.15292,86	4.92353,57	0.07646,43	0.07406,30	4.92593,60	19
42	0.14825,29	0.15280,09	4.92359,95	0.07640,05	0.07412,64	4.92587,35	18
43	0.14837,80	0.15267,33	4.92366,33	0.07633,66	0.07418,90	4.92581,10	17
44	0.14850,31	0.15254,57	4.92372,71	0.07627,28	0.07425,16	4.92574,84	16
45	0.14862,83	0.15241,83	4.92379,08	0.07620,92	0.07431,42	4.92568,58	15
46	0.14875,35	0.15229,09	4.92385,45	0.07614,55	0.07437,67	4.92562,32	14
47	0.14887,89	0.15216,35	4.92391,82	0.07608,18	0.07443,94	4.92556,05	13
48	0.14900,43	0.15203,63	4.92398,18	0.07601,82	0.07450,22	4.92549,78	12
49	0.14912,98	0.15190,91	4.92404,54	0.07595,46	0.07456,49	4.92543,51	11
50	0.14925,54	0.15178,20	4.92410,90	0.07589,10	0.07462,77	4.92537,23	10
51	0.14938,10	0.15165,50	4.92417,25	0.07582,75	0.07469,05	4.92530,95	9
52	0.14950,67	0.15152,80	4.92423,60	0.07576,40	0.07475,33	4.92524,66	8
53	0.14963,25	0.15140,11	4.92429,94	0.07570,05	0.07481,63	4.92518,37	7
54	0.14975,83	0.15127,43	4.92436,28	0.07563,72	0.07487,92	4.92512,08	6
55	0.14988,43	0.15114,76	4.92442,62	0.07557,38	0.07494,21	4.92505,78	5
56	0.15001,03	0.15102,09	4.92448,95	0.07551,04	0.07500,52	4.92499,43	4
57	0.15013,63	0.15089,43	4.92455,28	0.07544,72	0.07506,82	4.92493,13	3
58	0.15026,25	0.15076,78	4.92461,61	0.07538,39	0.07513,11	4.92486,87	2
59	0.15038,87	0.15064,14	4.92467,93	0.07532,07	0.07519,43	4.92480,56	1
60	0.15051,50	0.15051,50	4.92474,25	0.07525,75	0.07525,75	4.92474,25	0
M	Cotsecants.	Secants.	Half Cof.	Half Sec.	Half Cofec.	Half Sines.	M

[illegible]

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	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Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		3°		4°		5°		6°		7°		Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	S	M
53	0	38,20	8,05	41,1	13,65	42,34	19,40	44,15	25,20	45,16	31,00	0	53
	10	38,30	8,10	41,11	13,75	43,4	19,50	44,25	25,30	45,26	31,15	10	
	20	38,40	8,20	41,21	13,85	43,14	19,60	44,35	25,45	45,36	31,30	20	
	30	38,50	8,25	41,31	13,95	43,24	19,70	44,45	25,55	45,46	31,45	30	
	40	39,0	8,35	41,41	14,00	43,34	19,80	44,54	25,70	45,56	31,55	40	
	50	39,10	8,40	41,51	14,10	43,44	19,90	45,4	25,80	46,5	31,70	50	
54	0	39,20	8,45	42,1	14,20	43,53	20,05	45,14	25,95	46,15	31,85	0	54
	10	39,30	8,55	42,11	14,30	44,3	20,15	45,24	26,05	46,25	32,00	10	
	20	39,40	8,60	42,21	14,35	44,13	20,25	45,34	26,20	46,35	32,15	20	
	30	39,50	8,65	42,31	14,45	44,23	20,35	45,44	26,30	46,45	32,30	30	
	40	40,0	8,70	42,41	14,55	44,33	20,45	45,54	26,45	46,55	32,45	40	
	50	40,10	8,80	42,51	14,65	44,43	20,55	46,4	26,55	47,5	32,60	50	
55	0	40,20	8,85	43,1	14,70	44,53	20,65	46,14	26,70	47,15	32,75	0	55
	10	40,30	8,95	43,11	14,80	45,3	20,80	46,24	26,80	47,25	32,90	10	
	20	40,40	9,00	43,21	14,90	45,13	20,90	46,34	26,95	47,35	33,05	20	
	30	40,50	9,05	43,31	15,00	45,23	21,00	46,44	27,05	47,45	33,15	30	
	40	41,0	9,15	43,41	15,05	45,33	21,10	46,54	27,20	47,54	33,30	40	
	50	41,10	9,20	43,51	15,15	45,43	21,20	47,4	27,30	48,4	33,45	50	
56	0	41,20	9,25	44,1	15,25	45,53	21,30	47,14	27,45	48,14	33,60	0	56
	10	41,30	9,35	44,11	15,35	46,3	21,45	47,24	27,55	48,24	33,75	10	
	20	41,40	9,40	44,21	15,40	46,13	21,55	47,34	27,65	48,34	33,90	20	
	30	41,50	9,45	44,31	15,50	46,23	21,65	47,44	27,70	48,44	34,00	30	
	40	42,0	9,55	44,41	15,60	46,33	21,75	47,54	27,90	48,54	34,15	40	
	50	42,10	9,60	44,51	15,70	46,43	21,85	48,3	28,05	49,4	34,30	50	
57	0	42,20	9,65	45,1	15,75	46,53	21,95	48,13	28,15	49,14	34,45	0	57
	10	42,30	9,75	45,11	15,85	47,13	22,05	48,23	28,30	49,24	34,60	10	
	20	42,40	9,80	45,21	15,95	47,13	22,15	48,33	28,40	49,34	34,75	20	
	30	42,50	9,85	45,31	16,00	47,23	22,25	48,43	28,55	49,44	34,85	30	
	40	43,0	9,95	45,41	16,10	47,33	22,35	48,53	28,65	49,54	35,00	40	
	50	43,10	10,00	45,51	16,20	47,43	22,45	49,3	28,80	50,4	35,15	50	
58	0	43,20	10,05	46,0	16,25	47,52	23,55	49,13	28,90	50,14	35,30	0	58
	10	43,30	10,15	46,10	16,35	48,2	23,70	49,23	29,05	50,24	35,45	10	
	20	43,40	10,20	46,20	16,45	48,12	23,80	49,33	29,15	50,34	35,60	20	
	30	43,50	10,30	46,30	16,55	48,22	23,90	49,43	29,30	50,43	35,70	30	
	40	44,0	10,35	46,40	16,60	48,32	23,00	49,53	29,40	50,53	35,85	40	
	50	44,10	10,45	46,50	16,70	48,42	23,10	50,3	29,55	51,3	36,00	50	
59	0	44,20	10,50	47,0	16,80	48,52	23,20	50,13	29,65	51,13	36,15	0	59
	10	44,30	10,55	47,10	16,90	49,2	23,35	50,23	29,80	51,23	36,30	10	
	20	44,40	10,65	47,20	16,95	49,12	23,45	50,33	29,90	51,33	36,45	20	
	30	44,50	10,70	47,30	17,05	49,22	23,55	50,43	30,05	51,43	36,60	30	
	40	45,0	10,75	47,40	17,15	49,32	23,65	50,53	30,15	51,53	36,75	40	
	50	45,10	10,85	47,50	17,25	49,42	23,75	51,2	30,30	52,3	36,90	50	
60	0	45,19	10,90	48,0	17,35	49,52	23,85	51,12	30,40	52,13	37,05	0	60
	10	45,29	10,95	48,10	17,40	50,2	24,00	51,22	30,55	52,23	37,15	10	
	20	45,39	11,05	48,20	17,50	50,12	24,10	51,32	30,65	52,33	37,30	20	
	30	45,49	11,10	48,30	17,60	50,22	24,20	51,42	30,80	52,43	37,45	30	
	40	45,59	11,15	48,40	17,70	50,32	24,30	51,52	30,90	52,52	37,60	40	
	50	46,9	11,25	48,50	17,75	50,42	24,40	52,2	31,05	53,2	37,75	50	
61	0	46,19	11,30	49,0	17,85	50,52	24,50	52,12	31,20	53,12	37,90	0	61
	10	46,29	11,40	49,10	17,95	51,2	24,60	52,22	31,30	53,22	38,05	10	
	20	46,39	11,45	49,20	18,05	51,12	24,75	52,32	31,45	53,32	38,20	20	
	30	46,49	11,55	49,30	18,10	51,22	24,85	52,42	31,55	53,42	38,35	30	
	40	46,59	11,60	49,40	18,20	51,32	24,95	52,52	31,70	53,52	38,50	40	
	50	47,9	11,70	49,50	18,30	51,42	25,05	53,2	31,80	54,2	38,65	50	
62	0	47,19	11,75	50,0	18,40	51,52	25,15	53,12	31,95	54,12	38,80	0	62
	10	47,29	11,80	50,10	18,45	52,2	25,25	53,22	32,10	54,22	38,95	10	
	20	47,39	11,85	50,20	18,50	52,12	25,35	53,32	32,25	54,32	39,10	20	
	30	47,49	11,90	50,30	18,55	52,22	25,45	53,42	32,40	54,42	39,25	30	
	40	47,59	11,95	50,40	18,60	52,32	25,55	53,52	32,55	54,52	39,40	40	
	50	48,09	12,00	50,50	18,65	52,42	25,65	54,2	32,70	55,2	39,55	50	
Moon's Hor. Par.		3°		4°		5°		6°		7°		Moon's Hor. Par.	
		Corr.		Loga- rithms.		Corr.		Loga- rithms.		Corr.		Loga- rithms.	

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		8°		9°		10°		11°		12°		Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	S	M
53	0	46.0	36.80	46.32	37.0	46.57	37.40	47.15	38.15	47.27	39.85	0	53
	10	46.10	36.95	46.42	37.80	47.7	38.60	47.25	38.35	47.37	40.10	10	
	20	46.20	37.15	46.52	38.00	47.17	38.80	47.35	38.60	47.47	40.30	20	
	30	46.30	37.30	47.2	38.15	47.26	38.98	47.45	38.80	47.56	40.55	30	
	40	46.39	37.45	47.22	38.35	47.36	39.15	47.54	39.00	48.6	40.80	40	
	50	46.49	37.65	47.22	38.55	47.46	39.35	48.4	39.25	48.16	41.05	50	
54	0	46.59	37.80	47.32	38.70	47.56	39.55	48.14	39.45	48.26	41.30	0	54
	10	47.9	37.95	47.42	38.90	48.6	39.75	48.24	39.70	48.36	41.50	10	
	20	47.19	38.10	47.51	39.05	48.16	39.95	48.34	39.90	48.45	41.75	20	
	30	47.29	38.30	48.1	39.25	48.26	40.15	48.43	40.10	48.55	42.00	30	
	40	47.38	38.45	48.11	39.40	48.36	40.35	48.53	40.35	49.5	42.20	40	
	50	47.48	38.60	48.21	39.60	48.45	40.55	49.3	40.55	49.15	42.45	50	
55	0	47.58	38.75	48.31	39.75	48.55	40.75	49.13	40.75	49.25	42.70	0	55
	10	48.7	38.90	48.42	39.95	49.5	40.95	49.23	40.95	49.34	42.90	10	
	20	48.18	39.05	48.50	40.10	49.15	41.15	49.32	41.10	49.44	43.15	20	
	30	48.28	39.20	49.0	40.30	49.25	41.35	49.42	41.30	49.54	43.40	30	
	40	48.38	39.40	49.10	40.50	49.34	41.55	49.52	41.55	50.4	43.65	40	
	50	48.48	39.55	49.20	40.65	49.44	41.75	50.2	41.75	50.12	43.90	50	
56	0	48.58	39.70	49.30	40.85	49.54	41.95	50.12	41.95	50.22	44.10	0	56
	10	49.7	39.85	49.40	41.05	50.4	42.15	50.21	42.15	50.32	44.35	10	
	20	49.17	40.05	49.50	41.20	50.14	42.35	50.31	42.35	50.43	44.60	20	
	30	49.27	40.20	49.59	41.40	50.24	42.55	50.41	42.55	50.53	44.80	30	
	40	49.37	40.35	50.9	41.55	50.34	42.75	50.51	42.75	51.1	45.07	40	
	50	49.47	40.60	50.19	41.75	50.43	42.95	51.1	42.95	51.12	45.30	50	
57	0	49.57	40.70	50.29	41.90	50.53	43.15	51.11	43.15	51.22	45.50	0	57
	10	50.7	40.85	50.39	42.15	51.3	43.30	51.20	43.30	51.32	45.75	10	
	20	50.17	41.00	50.49	42.35	51.13	43.50	51.30	43.50	51.42	46.00	20	
	30	50.27	41.20	50.59	42.55	51.23	43.70	51.40	43.70	51.52	46.20	30	
	40	50.37	41.35	51.9	42.60	51.33	43.90	51.50	43.90	52.1	46.45	40	
	50	50.47	41.50	51.19	42.80	51.43	44.10	52.0	44.10	52.13	46.70	50	
58	0	50.57	41.65	51.29	42.90	51.52	44.20	52.9	44.20	52.20	46.90	0	58
	10	51.6	41.80	51.38	43.15	52.2	44.50	52.19	44.50	52.30	47.15	10	
	20	51.16	42.00	51.48	43.35	52.12	44.70	52.29	44.70	52.40	47.40	20	
	30	51.26	42.15	51.58	43.55	52.22	44.90	52.39	44.90	52.50	47.60	30	
	40	51.36	42.30	52.2	43.70	52.32	45.10	52.49	45.10	52.6	47.85	40	
	50	51.46	42.45	52.18	43.90	52.41	45.30	52.59	45.30	52.70	48.10	50	
59	0	51.56	42.65	52.28	44.10	52.51	45.50	53.08	45.50	53.19	48.30	0	59
	10	52.6	42.80	52.38	44.30	53.1	45.70	53.18	45.70	53.29	48.55	10	
	20	52.16	42.95	52.48	44.45	53.11	45.90	53.28	45.90	53.39	48.80	20	
	30	52.26	43.15	52.58	44.65	53.21	46.10	53.38	46.10	53.49	49.05	30	
	40	52.36	43.30	53.7	44.80	53.34	46.30	53.48	46.30	53.59	49.30	40	
	50	52.46	43.45	53.17	45.00	53.41	46.50	53.58	46.50	54.1	49.50	50	
60	0	52.56	43.60	53.27	45.15	53.50	46.70	54.7	46.70	54.18	49.75	0	60
	10	53.5	43.80	53.37	45.35	54.0	46.90	54.17	46.90	54.28	50.00	10	
	20	53.15	43.95	53.47	45.50	54.10	47.10	54.27	47.10	54.38	50.20	20	
	30	53.25	44.10	53.57	45.70	54.20	47.30	54.37	47.30	54.47	50.45	30	
	40	53.35	44.25	54.7	45.90	54.30	47.50	54.47	47.50	54.57	50.70	40	
	50	53.45	44.45	54.16	46.15	54.40	47.70	54.57	47.70	54.68	50.95	50	
61	0	53.55	44.60	54.26	46.25	54.50	47.90	55.6	47.90	55.17	51.15	0	61
	10	54.4	44.75	54.36	46.40	54.59	48.10	55.16	48.10	55.27	51.40	10	
	20	54.14	44.90	54.46	46.60	55.9	48.30	55.26	48.30	55.36	51.65	20	
	30	54.24	45.10	54.56	46.80	55.19	48.50	55.36	48.50	55.46	51.90	30	
	40	54.34	45.25	55.6	47.05	55.29	48.70	55.46	48.70	55.56	52.10	40	
	50	54.44	45.45	55.16	47.25	55.39	48.90	55.56	48.90	55.6	52.35	50	
62	0	54.54	45.55	55.26	47.35	55.49	49.10	56.5	49.10	56.16	52.60	0	62
M	S	M	S	M	S	M	S	M	S	M	S	M	S
Moon's Hor. Par.		Corr. rithms.		Corr. rithms.		Corr. rithms.		Corr. rithms.		Corr. rithms.		Moon's Hor. Par.	
		8°		9°		10°		11°		12°			

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		13°		14°		15°		16°		17°		Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	S	M
53	0	47.35	65.60	47.40	71.20	47.42	77.00	47.40	82.60	47.36	88.20	0	53
	10	47.45	65.85	47.50	71.55	47.52	77.30	47.50	82.90	47.46	88.50	10	
	20	47.55	66.10	47.59	72.10	48.1	77.55	47.59	83.20	47.55	88.85	20	
	30	48.1	66.35	48.9	72.35	48.12	77.85	48.9	83.55	48.6	89.15	30	
	40	48.14	66.60	48.19	72.65	48.22	78.15	48.19	83.85	48.15	89.50	40	
	50	48.24	66.85	48.28	72.95	48.30	78.40	48.28	84.15	48.24	89.85	50	
54	0	48.34	67.10	48.38	73.20	48.40	78.70	48.38	84.45	48.34	90.15	0	54
	10	48.43	67.35	48.48	73.45	48.50	79.00	48.47	84.75	48.43	90.50	10	
	20	48.53	67.60	48.58	73.70	48.59	79.30	48.57	85.05	48.53	90.80	20	
	30	49.1	67.85	49.7	73.95	49.9	79.55	49.6	85.35	49.2	91.15	30	
	40	49.13	68.10	49.17	74.25	49.19	79.85	49.16	85.65	49.12	91.45	40	
	50	49.22	68.35	49.27	74.50	49.28	80.15	49.26	85.95	49.21	91.80	50	
55	0	49.32	68.60	49.36	74.80	49.38	80.45	49.35	86.25	49.31	92.10	0	55
	10	49.42	68.85	49.46	75.10	49.48	80.70	49.45	86.55	49.41	92.45	10	
	20	49.52	69.10	49.56	75.40	49.57	81.00	49.54	86.90	49.50	92.75	20	
	30	50.1	69.35	50.5	75.70	50.7	81.30	50.4	87.20	50.0	93.10	30	
	40	50.11	69.60	50.15	76.00	50.16	81.60	50.14	87.50	50.10	93.40	40	
	50	50.21	69.90	50.25	76.30	50.26	81.85	50.23	87.80	50.19	93.75	50	
56	0	50.31	70.15	50.35	76.65	50.36	82.15	50.33	88.10	50.29	94.05	0	56
	10	50.41	70.40	50.44	76.95	50.45	82.45	50.42	88.40	50.38	94.40	10	
	20	50.50	70.65	50.54	77.25	50.55	82.75	50.52	88.75	50.48	94.70	20	
	30	51.0	70.90	51.4	77.55	51.5	83.05	51.2	89.05	50.57	95.05	30	
	40	51.10	71.15	51.13	77.85	51.14	83.30	51.11	89.35	51.7	95.35	40	
	50	51.20	71.40	51.23	78.15	51.24	83.60	51.21	89.65	51.16	95.70	50	
57	0	51.29	71.65	51.33	78.40	51.34	83.90	51.31	89.95	51.26	96.00	0	57
	10	51.39	71.90	51.42	78.70	51.43	84.20	51.40	90.25	51.35	96.35	10	
	20	51.49	72.15	51.52	79.00	51.53	84.45	51.50	90.55	51.45	96.65	20	
	30	51.59	72.40	52.2	79.30	52.2	84.75	51.59	90.85	51.54	97.00	30	
	40	52.8	72.70	52.11	79.60	52.12	85.05	52.9	91.15	52.4	97.30	40	
	50	52.18	72.95	52.21	79.90	52.22	85.30	52.19	91.45	52.14	97.65	50	
58	0	52.28	73.20	52.31	79.40	52.31	85.60	52.28	91.75	52.23	97.95	0	58
	10	52.38	73.45	52.41	79.70	52.41	85.90	52.38	92.05	52.33	98.30	10	
	20	52.47	73.70	52.50	79.95	52.51	86.20	52.48	92.40	52.43	98.60	20	
	30	52.57	73.95	53.0	80.20	53.0	86.45	52.57	92.70	52.52	98.95	30	
	40	53.7	74.20	53.10	80.45	53.10	86.75	53.7	93.00	53.2	99.25	40	
	50	53.17	74.45	53.19	80.75	53.19	87.05	53.17	93.33	53.11	99.60	50	
59	0	53.26	74.70	53.29	81.00	53.29	87.35	53.26	93.60	53.21	99.90	0	59
	10	53.36	74.95	53.39	81.30	53.39	87.65	53.36	93.90	53.30	100.25	10	
	20	53.46	75.20	53.49	81.55	53.49	87.95	53.46	94.25	53.40	100.55	20	
	30	53.56	75.45	53.58	81.85	53.58	88.25	53.55	94.55	53.50	100.90	30	
	40	54.5	75.70	54.8	82.10	54.8	88.50	54.5	94.85	53.59	101.20	40	
	50	54.15	75.95	54.18	82.40	54.18	88.80	54.14	95.15	54.9	101.55	50	
60	0	54.25	76.20	54.28	82.65	54.28	89.10	54.24	95.45	54.18	101.85	0	60
	10	54.35	76.45	54.37	82.95	54.37	89.40	54.34	95.75	54.28	102.20	10	
	20	54.44	76.70	54.47	83.20	54.47	89.70	54.43	96.10	54.38	102.50	20	
	30	54.54	76.95	54.57	83.50	54.56	89.95	54.53	96.40	54.47	102.75	30	
	40	55.4	77.25	55.6	83.75	55.6	90.25	55.2	96.70	54.57	103.15	40	
	50	55.14	77.50	55.16	84.05	55.16	90.55	55.12	97.00	55.6	103.50	50	
61	0	55.23	77.75	55.26	84.30	55.26	90.85	55.21	97.30	55.16	103.80	0	61
	10	55.33	78.00	55.35	84.60	55.35	91.15	55.31	97.60	55.25	104.15	10	
	20	55.43	78.25	55.45	84.85	55.45	91.45	55.41	97.95	55.35	104.45	20	
	30	55.53	78.50	55.55	85.15	55.54	91.75	55.50	98.25	55.45	104.80	30	
	40	56.2	78.75	56.4	85.40	56.4	92.00	56.0	98.55	55.54	105.10	40	
	50	56.12	79.00	56.14	85.70	56.14	92.30	56.9	98.85	56.4	105.45	50	
62	0	56.22	79.25	56.24	86.00	56.24	92.60	56.19	99.15	56.13	105.75	0	62
M	S	M	S	M	S	M	S	M	S	M	S	M	S
Moon's Hor. Par.		Corr.		Loga- rithms.		Corr.		Loga- rithms.		Corr.		Loga- rithms.	
		13°		14°		15°		16°		17°		Moon's Hor. Par.	

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		18°		19°		20°		21°		Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	S	M
		M	S	M	S	M	S	M	S		
53	0	47.31	93.80	47.23	99.35	47.13	104.90	47.2	110.40	0	53
	10	47.41	94.15	47.33	99.70	47.23	105.25	47.11	110.80	10	
	20	47.50	94.50	47.42	100.10	47.32	105.65	47.21	111.20	20	
	30	48.0	94.80	47.52	100.45	47.41	106.00	47.30	111.55	30	
	40	48.9	95.15	48.1	100.80	47.50	106.40	47.39	111.95	40	
	50	48.19	95.50	48.10	101.15	48.0	106.75	47.49	112.35	50	
54	0	48.28	95.85	48.20	101.50	48.9	107.15	47.58	112.75	0	54
	10	48.38	96.20	48.29	101.85	48.19	107.50	48.7	113.15	10	
	20	48.47	96.55	48.39	102.25	48.28	107.90	48.17	113.50	20	
	30	48.57	96.85	48.48	102.60	48.38	108.25	48.26	113.90	30	
	40	49.6	97.20	48.58	102.95	48.47	108.65	48.35	114.30	40	
	50	49.16	97.55	49.7	103.30	48.57	109.00	48.45	114.70	50	
55	0	49.25	97.90	49.16	103.65	49.6	109.40	48.54	115.10	0	55
	10	49.35	98.25	49.25	104.00	49.16	109.75	49.4	115.50	10	
	20	49.44	98.60	49.35	104.35	49.25	110.15	49.13	115.85	20	
	30	49.54	98.90	49.44	104.75	49.34	110.50	49.22	116.25	30	
	40	50.3	99.25	49.53	105.10	49.44	110.90	49.32	116.65	40	
	50	50.13	99.60	50.3	105.45	49.53	111.25	49.41	117.05	50	
56	0	50.22	99.95	50.13	105.80	50.2	111.65	49.50	117.45	0	56
	10	50.32	100.30	50.22	106.15	50.12	112.00	49.59	117.80	10	
	20	50.41	100.65	50.32	106.55	50.21	112.40	50.9	118.20	20	
	30	50.51	100.95	50.41	106.90	50.31	112.75	50.18	118.60	30	
	40	51.0	101.35	50.51	107.25	50.40	113.15	50.27	119.00	40	
	50	51.10	101.65	51.0	107.60	50.50	113.50	50.37	119.40	50	
57	0	51.19	102.00	51.10	107.95	50.59	113.90	50.46	119.80	0	57
	10	51.29	102.35	51.19	108.30	51.8	114.25	50.55	120.20	10	
	20	51.38	102.70	51.29	108.70	51.18	114.65	51.5	120.60	20	
	30	51.48	103.00	51.38	109.05	51.27	115.00	51.14	121.00	30	
	40	51.57	103.35	51.47	109.40	51.37	115.40	51.23	121.40	40	
	50	52.7	103.70	51.57	109.75	51.46	115.75	51.33	121.80	50	
58	0	52.16	104.05	52.6	110.10	51.55	116.15	51.42	122.20	0	58
	10	52.26	104.40	52.16	110.50	52.5	116.50	51.51	122.55	10	
	20	52.35	104.75	52.25	110.85	52.14	116.90	52.1	122.95	20	
	30	52.45	105.05	52.35	111.20	52.23	117.25	52.10	123.35	30	
	40	52.54	105.40	52.44	111.55	52.33	117.65	52.19	123.75	40	
	50	53.4	105.75	52.54	111.90	52.42	118.00	52.29	124.15	50	
59	0	53.13	106.10	53.3	112.30	52.51	118.40	52.38	124.55	0	59
	10	53.23	106.45	53.13	112.65	53.1	118.75	52.47	124.95	10	
	20	53.32	106.80	53.22	113.00	53.10	119.15	52.57	125.35	20	
	30	53.42	107.10	53.32	113.35	53.20	119.50	53.6	125.70	30	
	40	53.51	107.45	53.41	113.75	53.29	119.90	53.15	126.10	40	
	50	54.1	107.80	53.51	114.10	53.39	120.30	53.25	126.50	50	
60	0	54.10	108.15	54.0	114.45	53.48	120.80	53.35	126.90	0	60
	10	54.20	108.50	54.9	114.80	53.57	121.05	53.43	127.30	10	
	20	54.29	108.85	54.19	115.20	54.7	121.45	53.53	127.70	20	
	30	54.39	109.15	54.28	115.55	54.16	121.80	54.2	128.10	30	
	40	54.48	109.50	54.38	115.90	54.25	122.20	54.11	128.50	40	
	50	54.58	109.85	54.47	116.25	54.35	122.55	54.21	128.90	50	
61	0	55.7	110.20	54.57	116.65	54.44	122.95	54.30	129.30	0	61
	10	55.17	110.55	55.6	117.00	54.53	123.30	54.39	129.65	10	
	20	55.26	110.90	55.15	117.35	55.3	123.70	54.49	130.05	20	
	30	55.36	111.25	55.25	117.70	55.12	124.05	54.58	130.45	30	
	40	55.45	111.60	55.34	118.10	55.21	124.45	55.7	130.85	40	
	50	55.55	111.95	55.44	118.45	55.31	124.80	55.17	131.25	50	
62	0	56.4	112.30	55.53	118.80	55.40	125.20	55.26	131.65	0	62
M	S	M	S	M	S	M	S	M	S	M	S
Moon's Hor. Par.		Corr.		Loga- rithms.		Corr.		Loga- rithms.		Moon's Hor. Par.	
		18°		19°		20°		21°			

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		22°		23°		24°		25°		Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	M	S
53	0	46,48	115,80	46,33	121,15	46,18	126,60	46,0	131,85	0	53
	10	46,57	116,25	46,42	121,60	46,27	127,05	46,9	132,30	10	
	20	47,7	116,65	46,52	122,00	46,36	127,50	46,18	132,80	20	
	30	47,16	117,05	47,1	122,45	46,44	127,90	46,27	133,25	30	
	40	47,25	117,45	47,10	122,90	46,54	128,35	46,36	133,70	40	
	50	47,34	117,85	47,19	123,30	47,3	128,80	46,45	134,15	50	
54	0	47,44	118,25	47,29	123,75	47,12	129,25	46,53	134,65	0	54
	10	47,53	118,70	47,38	124,15	47,22	129,70	47,1	135,10	10	
	20	48,1	119,10	47,47	124,60	47,31	130,15	47,13	135,55	20	
	30	48,12	119,50	47,57	125,00	47,40	130,60	47,22	136,00	30	
	40	48,21	119,90	48,6	125,45	47,49	131,00	47,31	136,50	40	
	50	48,30	120,30	48,15	125,85	47,58	131,45	47,40	136,95	50	
55	0	48,39	120,70	48,24	126,30	48,7	131,90	47,49	137,40	0	55
	10	48,49	121,15	48,33	126,75	48,16	132,30	47,58	137,85	10	
	20	48,58	121,55	48,42	127,15	48,25	132,60	48,7	138,35	20	
	30	49,7	121,95	48,52	127,60	48,35	133,00	48,17	138,80	30	
	40	49,17	122,35	49,1	128,05	48,44	133,70	48,26	139,25	40	
	50	49,26	122,75	49,20	128,45	48,53	134,10	48,35	139,70	50	
56	0	49,35	123,15	49,19	128,90	49,2	134,55	48,44	140,20	0	56
	10	49,44	123,60	49,28	129,35	49,11	135,00	48,53	140,65	10	
	20	49,54	124,00	49,38	129,75	49,20	135,45	49,2	141,10	20	
	30	50,3	124,40	49,47	130,20	49,29	135,90	49,11	141,55	30	
	40	50,12	124,80	49,56	130,60	49,39	136,25	49,20	142,00	40	
	50	50,22	125,25	50,5	131,00	49,48	136,80	49,29	142,30	50	
57	0	50,31	125,65	50,14	131,45	49,57	137,25	49,38	142,95	0	57
	10	50,40	126,05	50,23	131,90	50,6	137,70	49,47	143,40	10	
	20	50,49	126,50	50,33	132,30	50,15	138,15	49,56	143,85	20	
	30	50,59	126,90	50,42	132,75	50,24	138,60	50,5	144,35	30	
	40	51,8	127,30	50,51	133,20	50,34	139,00	50,14	144,80	40	
	50	51,17	127,70	51,1	133,60	50,43	139,45	50,23	145,25	50	
58	0	51,26	128,10	51,10	134,05	50,52	139,90	50,32	145,70	0	58
	10	51,36	128,55	51,19	134,50	51,1	140,35	50,41	146,20	10	
	20	51,45	128,95	51,28	134,90	51,10	140,80	50,50	146,65	20	
	30	51,54	129,30	51,37	135,35	51,19	141,25	50,59	147,10	30	
	40	52,4	129,75	51,57	135,75	51,29	141,70	51,9	147,55	40	
	50	52,13	130,20	52,56	136,20	51,38	142,15	51,18	148,00	50	
59	0	52,22	130,60	52,5	136,60	51,47	142,60	51,27	148,50	0	59
	10	52,31	131,00	52,14	137,05	51,56	143,05	51,36	148,95	10	
	20	52,41	131,45	52,23	137,45	52,5	143,50	51,45	149,40	20	
	30	52,50	131,80	52,32	137,90	52,14	143,90	51,54	149,85	30	
	40	52,59	132,25	52,42	138,30	52,23	144,35	52,3	150,35	40	
	50	53,9	132,65	52,51	138,75	52,32	144,80	52,22	150,80	50	
60	0	53,18	133,04	53,0	139,15	52,41	145,25	52,21	151,25	0	60
	10	53,27	133,55	53,9	139,60	52,51	145,70	52,30	151,70	10	
	20	53,36	133,90	53,18	140,05	53,0	146,15	52,39	152,20	20	
	30	53,45	134,30	53,27	140,45	53,9	146,60	52,48	152,65	30	
	40	53,55	134,70	53,37	140,90	53,18	147,00	52,57	153,10	40	
	50	54,4	135,15	53,46	141,30	53,27	147,45	53,6	153,55	50	
61	0	54,13	135,50	53,55	141,75	53,36	147,90	53,15	154,05	0	61
	10	54,22	135,95	54,4	142,15	53,45	148,35	53,25	154,50	10	
	20	54,32	136,35	54,14	142,50	53,55	148,80	53,34	154,95	20	
	30	54,41	136,75	54,23	143,00	54,4	149,25	53,43	155,45	30	
	40	54,50	137,15	54,32	143,45	54,13	149,70	53,52	155,90	40	
	50	55,0	137,60	54,42	143,85	54,22	150,15	53,1	156,35	50	
62	0	55,9	138,00	54,52	144,30	54,31	150,60	54,10	156,85	0	62
M	S	M	S	M	S	M	S	M	S	M	S
Moon's		Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Moon's	
Hor. Par.										Hor. Par.	

Apparent Altitude of the Moon's Centre.

Apparent Altitude of the Moon's Centre.																
Moon's Hor. Par.		26°			27°			28°			29°			Moon's Hor. Par.		
M	S	Corr.	Loga- rithms.		M	S	Corr.	Loga- rithms.		M	S	Corr.	Loga- rithms.		M	S
53	0	45.42	137.15		45.22	142.40	45.1	147.60		44.39	152.75		44.39	0	53	
	10	45.51	137.65		45.31	142.90	45.10	148.10		44.48	153.25		44.48	10		
	20	46.0	138.10		45.40	143.40	45.19	148.60		44.57	153.80		44.57	20		
	30	46.9	138.60		45.49	143.90	45.27	149.15		45.6	154.30		45.6	30		
	40	46.18	139.10		45.58	144.40	45.36	149.65		45.15	154.85		45.15	40		
	50	46.27	139.55		46.7	144.90	45.45	150.16		45.22	155.35		45.22	50		
54	0	46.36	140.05		46.16	145.20	45.54	150.65		45.31	155.90		45.31	0	54	
	10	46.45	140.50		46.24	145.85	46.3	151.15		45.39	156.40		45.39	10		
	20	46.54	141.00		46.33	146.35	46.12	151.70		45.48	156.95		45.48	20		
	30	47.3	141.45		46.42	146.85	46.21	152.20		45.57	157.45		45.57	30		
	40	47.12	141.95		46.51	147.35	46.29	152.70		46.6	158.00		46.6	40		
	50	47.21	142.40		47.0	147.85	46.38	153.20		46.15	158.50		46.15	50		
55	0	47.30	142.90		47.9	148.35	46.47	153.70		46.24	159.05		46.24	0	55	
	10	47.39	143.40		47.18	148.85	46.56	154.25		46.33	159.55		46.33	10		
	20	47.43	143.85		47.27	149.30	47.5	154.75		46.41	160.10		46.41	20		
	30	47.57	144.35		47.36	149.80	47.13	155.25		46.50	160.60		46.50	30		
	40	48.6	144.86		47.45	150.30	47.21	155.75		46.58	161.15		46.58	40		
	50	48.15	145.30		47.54	150.80	47.31	156.25		47.7	161.65		47.7	50		
56	0	48.24	145.80		48.3	151.30	47.40	156.80		47.16	162.20		47.16	0	56	
	10	48.33	146.25		48.12	151.80	47.49	157.30		47.25	162.70		47.25	10		
	20	48.42	146.75		48.20	152.30	47.58	157.80		47.34	163.25		47.34	20		
	30	48.51	147.20		48.29	152.75	48.7	158.30		47.42	163.75		47.42	30		
	40	49.0	147.75		48.38	153.25	48.15	158.80		47.51	164.30		47.51	40		
	50	49.9	148.15		48.47	153.75	48.24	159.35		48.0	164.80		48.0	50		
57	0	49.18	148.65		48.56	154.25	48.33	159.85		48.9	165.35		48.9	0	57	
	10	49.27	149.10		49.5	154.75	48.42	160.35		48.17	165.85		48.17	10		
	20	49.36	149.60		49.14	155.25	48.51	160.85		48.26	166.40		48.26	20		
	30	49.45	150.05		49.23	155.75	49.0	161.40		48.35	166.90		48.35	30		
	40	49.54	150.55		49.31	156.20	49.8	161.90		48.44	167.45		48.44	40		
	50	50.3	151.00		49.40	156.70	49.17	162.40		48.53	167.95		48.53	50		
58	0	50.12	151.50		49.49	157.20	49.26	162.90		49.1	168.50		49.1	0	58	
	10	50.21	151.95		49.58	157.70	49.35	163.45		49.9	169.00		49.9	10		
	20	50.30	152.45		50.7	158.20	49.44	163.95		49.18	169.54		49.18	20		
	30	50.39	152.90		50.16	158.70	49.53	164.45		49.27	170.10		49.27	30		
	40	50.47	153.40		50.25	159.10	50.1	164.95		49.36	170.70		49.36	40		
	50	50.56	153.85		50.34	159.70	50.10	165.50		49.45	171.15		49.45	50		
59	0	51.5	154.35		50.43	160.20	50.19	166.00		49.54	171.70		49.54	0	59	
	10	51.14	154.80		50.51	160.70	50.28	166.50		50.2	172.20		50.2	10		
	20	51.22	155.30		51.0	161.20	50.37	167.00		50.11	172.75		50.11	20		
	30	51.32	155.80		51.9	161.70	50.46	167.55		50.20	173.25		50.20	30		
	40	51.41	156.25		51.18	162.20	50.54	168.05		50.29	173.80		50.29	40		
	50	51.50	156.75		51.27	162.70	51.3	168.55		50.37	174.30		50.37	50		
60	0	51.59	157.25		51.36	163.15	51.12	169.05		50.46	174.85		50.46	0	60	
	10	52.8	157.70		51.45	163.65	51.21	169.60		50.55	175.35		50.55	10		
	20	52.17	158.20		51.54	164.15	51.30	170.10		51.4	175.90		51.4	20		
	30	52.26	158.75		52.3	164.65	51.39	170.60		51.12	176.45		51.12	30		
	40	52.35	159.15		52.12	165.15	51.47	171.10		51.21	176.95		51.21	40		
	50	52.44	159.60		52.21	165.65	51.56	171.65		51.30	177.50		51.30	50		
61	0	52.53	160.10		52.30	166.15	52.5	172.15		51.39	178.05		51.39	0	61	
	10	53.2	160.60		52.38	166.65	52.14	172.65		51.47	178.55		51.47	10		
	20	53.11	161.05		52.47	167.15	52.23	173.15		51.56	179.10		51.56	20		
	30	53.20	161.55		52.56	167.65	52.32	173.65		52.5	179.60		52.5	30		
	40	53.29	162.05		53.5	168.15	52.40	174.20		52.14	180.15		52.14	40		
	50	53.38	162.50		53.14	168.65	52.49	174.70		52.22	180.75		52.22	50		
62	0	53.47	163.00		53.23	169.15	52.58	175.20		52.31	181.20		52.31	0	62	
M	S	M	S	Loga- rithms.	M	S	M	S	Loga- rithms.	M	S	M	S	Loga- rithms.	Moon's Hor. Par.	
				26°					27°						28°	
																29°

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		30°		31°		32°		33°		Moon's Hor. Par.	
		Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.		
M	S	M	S	M	S	M	S	M	S	S	M
53	0	44.15	157.80	43.51	162.85	43.26	167.85	42.59	172.75	0	53
	10	44.24	158.35	44.0	163.43	43.34	168.40	43.7	173.35	10	
	20	44.33	158.90	44.8	163.95	43.43	169.00	43.16	173.95	20	
	30	44.41	159.35	44.17	164.50	43.51	169.55	43.24	174.50	30	
	40	44.50	159.95	44.26	165.05	44.0	170.10	43.33	175.10	40	
	50	44.59	160.50	44.34	165.60	44.8	170.70	43.41	175.70	50	
54	0	45.7	161.05	44.43	166.20	44.16	171.25	43.50	176.30	0	54
	10	45.16	161.60	44.51	166.75	44.25	171.85	43.58	176.90	10	
	20	45.25	162.15	45.0	167.30	44.33	172.40	44.7	177.50	20	
	30	45.33	162.70	45.8	167.85	44.42	173.00	44.13	178.10	30	
	40	45.42	163.25	45.17	168.40	44.50	173.55	44.23	178.65	40	
	50	45.51	163.80	45.25	169.00	44.59	174.15	44.32	179.25	50	
55	0	45.59	164.35	45.34	169.55	45.7	174.70	44.40	179.85	0	55
	10	46.8	163.85	45.43	170.10	45.16	175.25	44.48	180.45	10	
	20	46.17	165.40	45.51	170.65	45.24	175.75	44.57	181.05	20	
	30	46.25	165.95	46.0	171.20	45.33	176.40	45.5	181.60	30	
	40	46.34	166.50	46.8	171.80	45.41	177.00	45.13	182.20	40	
	50	46.43	167.05	46.17	172.35	45.49	177.55	45.22	182.80	50	
56	0	46.51	167.60	46.25	172.90	45.58	178.15	45.30	183.40	0	56
	10	47.0	168.10	46.34	173.45	46.6	178.70	45.39	183.95	10	
	20	47.9	168.65	46.42	174.00	46.15	179.30	45.47	184.55	20	
	30	47.17	169.20	47.51	174.60	46.23	179.85	45.55	185.15	30	
	40	47.26	169.75	47.0	175.15	46.32	180.46	46.4	185.75	40	
	50	47.35	170.30	47.8	175.70	46.40	181.00	46.12	186.35	50	
57	0	47.43	170.85	47.17	176.25	46.49	181.60	46.21	186.90	0	57
	10	47.52	171.35	47.25	176.80	46.57	182.15	46.29	187.50	10	
	20	48.1	171.90	47.34	177.40	47.6	182.75	46.38	188.10	20	
	30	48.9	172.45	47.43	177.95	47.14	183.30	46.46	188.70	30	
	40	48.18	173.00	47.51	178.50	47.23	183.90	46.54	189.30	40	
	50	48.27	173.55	48.0	179.05	47.31	184.45	47.3	189.85	50	
58	0	48.36	174.10	48.8	179.60	47.40	185.05	47.11	190.45	0	58
	10	48.44	174.60	48.17	180.20	47.48	185.60	47.19	191.05	10	
	20	48.53	175.15	48.26	180.75	47.57	186.20	47.28	191.65	20	
	30	49.1	175.70	48.34	181.30	48.5	186.75	47.36	192.25	30	
	40	49.10	176.25	48.43	181.85	48.14	187.35	47.44	192.80	40	
	50	49.19	176.80	48.52	182.40	48.22	187.90	47.53	193.40	50	
59	0	49.27	177.35	49.0	183.00	48.31	188.50	48.1	194.00	0	59
	10	49.36	177.90	49.9	183.55	48.39	189.05	48.10	194.60	10	
	20	49.45	178.45	49.17	184.10	48.48	189.65	48.18	195.20	20	
	30	49.53	179.00	49.26	184.60	48.56	190.20	48.27	195.75	30	
	40	50.2	179.55	49.34	185.20	49.5	190.80	48.35	196.35	40	
	50	50.11	180.10	49.42	185.80	49.13	191.35	48.43	196.95	50	
60	0	50.19	180.65	49.51	186.35	49.22	191.95	48.52	197.55	0	60
	10	50.28	181.15	49.59	186.90	49.30	192.50	49.0	198.15	10	
	20	50.37	181.70	50.8	187.45	49.39	193.10	49.8	198.75	20	
	30	50.45	182.25	50.17	188.00	49.47	193.70	49.17	199.30	30	
	40	50.54	182.90	50.26	188.60	49.56	194.25	49.25	199.90	40	
	50	51.3	183.35	50.34	189.15	50.4	194.85	49.34	200.50	50	
61	0	51.11	183.90	50.43	189.70	50.13	195.45	49.42	201.10	0	61
	10	51.20	184.40	50.51	190.25	50.21	196.00	49.50	201.70	10	
	20	51.29	184.95	51.0	190.80	50.30	196.60	49.59	202.30	20	
	30	51.37	185.50	51.8	191.35	50.38	197.15	50.7	202.80	30	
	40	51.46	186.05	51.17	191.90	50.47	197.75	50.15	203.45	40	
	50	51.55	186.60	51.25	192.50	50.55	198.30	50.24	204.05	50	
62	0	52.3	187.15	51.34	193.05	51.4	198.90	50.32	204.65	0	62
Moon's Hor. Par.		30°		31°		32°		33°		Moon's Hor. Par.	
		Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.		
M	S	M	S	M	S	M	S	M	S	S	M

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		34°		35°		36°		37°		Moon's Hor. Par.												
M	S	Corr.	Loga- rithms.	M	S	Corr.	Loga- rithms.	M	S	Corr.	Loga- rithms.	M	S	Corr.	Loga- rithms.	M	S	Corr.	Loga- rithms.	S	M	
53	0	42.32	177.65	42.3	182.45	41.34	187.20	41.4	191.90	0	53	0	43.22	181.30	42.53	186.15	42.23	191.00	41.52	195.80	0	54
	10	42.40	178.25	42.11	183.05	41.42	187.85	41.12	192.55	10		10	43.30	181.90	43.1	186.80	42.32	191.65	42.0	196.45	10	
	20	42.48	178.85	42.19	183.70	41.50	188.45	41.20	193.20	20		20	43.38	182.50	43.9	187.40	42.40	192.30	42.8	197.10	20	
	30	42.57	179.45	42.28	184.39	41.59	189.10	41.28	193.85	30		30	43.47	183.10	43.18	188.05	42.48	192.90	42.16	197.75	30	
	40	43.5	180.05	42.36	184.90	42.7	189.75	41.36	194.50	40		40	43.55	183.70	43.26	188.65	42.56	193.55	42.24	198.40	40	
	50	43.13	180.70	42.44	185.55	42.15	190.35	41.44	195.15	50		50	44.3	184.30	43.34	189.30	43.4	194.20	42.32	199.05	50	
54	0	43.22	181.30	42.53	186.15	42.23	191.00	41.52	195.80	0	54	0	44.40	184.90	43.42	189.90	43.12	194.85	42.40	199.70	0	55
	10	43.30	181.90	43.1	186.80	42.32	191.65	42.0	196.45	10		10	44.48	185.55	43.50	190.60	43.20	195.45	42.48	200.35	10	
	20	43.38	182.50	43.9	187.40	42.40	192.30	42.8	197.10	20		20	44.56	186.15	43.58	191.15	43.28	196.10	42.56	201.00	20	
	30	43.47	183.10	43.18	188.05	42.48	192.90	42.16	197.75	30		30	44.56	186.75	44.6	191.75	43.36	196.75	43.4	201.65	30	
	40	43.55	183.70	43.26	188.65	42.56	193.55	42.24	198.40	40		40	44.65	187.35	44.15	192.35	43.44	197.40	43.12	202.30	40	
	50	44.3	184.30	43.34	189.30	43.4	194.20	42.32	199.05	50		50	44.53	187.95	44.23	193.00	43.52	198.00	43.20	202.95	50	
55	0	44.40	184.90	43.42	189.90	43.12	194.85	42.40	199.70	0	55	0	44.61	188.55	44.31	193.60	44.0	198.65	43.28	203.60	0	56
	10	44.48	185.55	43.50	190.60	43.20	195.45	42.48	200.35	10		10	44.70	189.15	44.39	194.25	44.8	199.30	43.36	204.25	10	
	20	44.56	186.15	43.58	191.15	43.28	196.10	42.56	201.00	20		20	44.78	189.75	44.47	194.85	44.16	199.90	43.44	204.90	20	
	30	44.56	186.75	44.6	191.75	43.36	196.75	43.4	201.65	30		30	44.87	190.35	44.55	195.50	44.24	200.55	43.52	205.55	30	
	40	44.65	187.35	44.15	192.35	43.44	197.40	43.12	202.30	40		40	44.95	190.95	45.4	196.10	44.32	201.20	44.0	206.20	40	
	50	44.53	187.95	44.23	193.00	43.52	198.00	43.20	202.95	50		50	45.42	191.55	45.12	196.75	44.40	201.85	44.8	206.85	50	
56	0	45.1	188.55	44.31	193.60	44.0	198.65	43.28	203.60	0	56	0	45.51	192.15	45.20	197.35	44.48	202.45	44.16	207.50	0	57
	10	45.9	189.15	44.39	194.25	44.8	199.30	43.36	204.25	10		10	45.59	192.75	45.28	197.95	44.57	203.10	44.24	208.35	10	
	20	45.17	189.75	44.47	194.85	44.16	199.90	43.44	204.90	20		20	45.68	193.35	45.36	198.55	45.5	203.70	44.32	208.85	20	
	30	45.26	190.35	44.55	195.50	44.24	200.55	43.52	205.55	30		30	45.76	193.95	45.44	199.15	45.13	204.35	44.40	209.45	30	
	40	45.34	190.95	45.4	196.10	44.32	201.20	44.0	206.20	40		40	45.85	194.55	45.53	199.75	45.22	205.00	44.47	210.10	40	
	50	45.42	191.55	45.12	196.75	44.40	201.85	44.8	206.85	50		50	45.93	195.15	45.61	200.35	45.29	205.65	44.55	210.75	50	
57	0	45.51	192.15	45.20	197.35	44.48	202.45	44.16	207.50	0	57	0	46.0	195.75	45.69	200.95	45.37	206.25	45.8	211.40	0	58
	10	46.0	192.75	45.28	197.95	44.57	203.10	44.24	208.35	10		10	46.08	196.35	45.77	201.55	45.45	206.90	45.11	212.05	10	
	20	46.8	193.35	45.36	198.55	45.5	203.70	44.32	208.85	20		20	46.16	196.95	45.85	202.15	45.53	207.55	45.19	212.70	20	
	30	46.16	194.00	45.45	199.15	45.13	204.35	44.40	209.45	30		30	46.25	197.55	45.93	202.75	45.61	208.20	45.27	213.35	30	
	40	46.25	194.60	45.53	199.75	45.22	205.00	44.47	210.10	40		40	46.33	198.15	46.01	203.35	45.69	208.80	45.35	214.00	40	
	50	46.33	195.20	46.1	200.35	45.29	205.65	44.55	210.75	50		50	46.42	198.75	46.09	203.95	45.77	209.40	45.43	214.65	50	
58	0	46.41	195.80	46.9	200.95	45.37	206.25	45.8	211.40	0	58	0	46.51	199.35	46.17	204.55	45.85	210.10	45.51	215.30	0	59
	10	46.49	196.40	46.17	201.55	45.45	206.90	45.11	212.05	10		10	46.59	199.95	46.25	205.15	45.93	210.70	45.59	215.95	10	
	20	46.57	197.00	46.25	202.15	45.53	207.55	45.19	212.70	20		20	46.68	200.55	46.33	205.75	46.01	211.30	45.67	216.60	20	
	30	46.66	197.60	46.33	202.75	45.61	208.20	45.27	213.35	30		30	46.76	201.15	46.41	206.35	46.09	211.90	45.75	217.25	30	
	40	46.74	198.20	46.41	203.35	45.69	208.80	45.35	214.00	40		40	46.85	201.75	46.49	206.95	46.17	212.50	45.83	217.90	40	
	50	46.82	198.80	46.50	204.00	45.77	209.40	45.43	214.65	50		50	46.93	202.35	46.57	207.55	46.25	213.10	45.91	218.55	50	
59	0	46.91	199.40	46.58	204.60	45.85	210.10	45.51	215.30	0	59	0	47.02	202.95	46.65	208.15	45.93	213.70	46.01	219.20	0	60
	10	47.00	200.00	46.66	205.20	45.93	210.70	45.59	215.95	10		10	47.10	203.55	46.73	208.75	46.09	214.30	46.09	219.85	10	
	20	47.08	200.60	46.74	205.80	46.01	211.30	46.17	216.60	20		20	47.18	204.15	46.81	209.35	46.17	214.90	46.17	220.50	20	
	30	47.16	201.20	46.82	206.40	46.09	211.90	46.25	217.25	30		30	47.27	204.75	46.89	210.00	46.25	215.50	46.25	221.15	30	
	40	47.24	201.80	46.91	207.00	46.17	212.50	46.33	217.90	40		40	47.35	205.35	46.97	210.60	46.33	216.10	46.33	221.80	40	
	50	47.32	202.40	47.00	207.60	46.25	213.10	46.41	218.55	50		50	47.43	205.95	47.05	211.20	46.41	216.70	46.41	222.45	50	
60	0	47.41	203.00	47.08	208.20	46.33	213.70	46.49	219.20	0	60	0	47.51	206.55	47.13	211.80	46.49	217.30	46.49	223.10	0	61
	10	47.49	203.60	47.16	208.80	46.41	214.30	46.57	219.85	10		10	47.60	207.15	47.21	212.40	46.57	217.90	46.57	223.75	10	
	20	47.57	204.20	47.24	209.40	46.49	214.90	46.65	220.50	20		20	47.68	207.75	47.29	213.00	46.65	218.50	46.65	224.40	20	
	30	47.65	204.80	47.32	210.00	46.57	215.50	46.73	221.15	30		30	47.77	208.35	47.37	213.60	46.73	219.10	46.73	225.05	30	
	40	47.73	205.40	47.41	210.60	46.65	216.10	46.81	221.80	40		40	47.85	208.95	47.45	214.20	46.81	220.70	46.81	225.70	40	
	50	47.81	206.00	47.49	211.20	46.73	216.70	46.89	222.45	50		50	47.93	209.55	47.53	214.80	46.89	221.30	46.89	226.35	50	
61	0	47.90	206.60	47.57	211.80	46.81	217.30	46.97	223.10	0	61	0	48.02	210.15	47.61	215.40	46.97	221.90	46.97	227.00	0	62
	10	47.98	207.20	47.65	212.40	46.89	217.90	47.05	223.75	10		10	48.10	210.75	47.69	216.00	47.05	222.50	47.05	227.65	10	
	20	48.06	207.80	47.73	213.00	46.97	218.50	47.13	224.40	20		20	48.18	211.35	47.77	216.60	47.13	223.10	47.13	228.30	20	
	30	48.14	208.40	47.81	213.60	47.05	219.10	47.21	225.05	30		30	48.26	211.95	47.85	217.20	47.21	223.70	47.21	228.95	30	
	40	48.22	209.00	47.89	214.20	47.13	219.70	47.29	225.70	40		40	48.34	212.55	47.93	217.80	47.29	224.30	47.29	229.60	40	
	50	48.30	209.60	47.97	214.80	47.21	220.30	47.37	226.35	50		50	48.42	213.15	48.01	218.40	47.37	224.90	47.37	230.25	50	
62	0	48.39	210.20	48.05	215.40	47.29	220.90	47.45	227.00	0	62	0	48.50	213.75	48.09	219.00	47.45	225.50	47.45	230.90	0	63
	10	48.47	210.80	48.13	216.00	47.37	221.50	47.53	227.65	10		10	48.58	214.35	48.17	219.60						

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.	38°			39°			40°			41°			Moon's Hor. Par.
	M	S	Loga- rithms.	M	S	Loga- rithms.	M	S	Loga- rithms.	M	S	Loga- rithms.	
53	0	40.33	196.55	40.1	201.15	39.28	205.65	38.54	210.10	0	53		
	10	40.41	197.20	40.8	201.80	39.36	206.35	39.2	210.80	10			
	20	40.49	197.90	40.16	202.50	39.43	207.05	39.9	211.50	20			
	30	40.56	198.55	40.20	203.15	39.51	207.70	39.17	212.20	30			
	40	41.4	199.20	40.32	203.85	39.59	208.40	39.25	212.95	40			
	50	41.12	199.85	40.39	204.50	40.6	209.10	39.32	213.65	50			
54	0	41.20	200.55	40.47	205.20	40.14	209.80	39.40	214.35	0	54		
	10	41.28	201.20	40.55	205.85	40.22	210.55	39.47	215.05	10			
	20	41.36	201.85	41.3	206.55	40.29	211.20	39.53	215.75	20			
	30	41.43	202.50	41.10	207.20	40.37	211.90	40.2	216.45	30			
	40	41.51	203.20	41.18	207.90	40.45	212.60	40.10	217.15	40			
	50	41.59	203.85	41.26	208.55	40.52	213.25	40.17	217.85	50			
55	0	42.7	204.50	41.34	209.25	41.0	213.95	40.25	218.60	0	55		
	10	42.15	205.20	41.42	209.95	41.8	214.65	40.32	219.30	10			
	20	42.23	205.85	41.49	210.60	41.5	215.35	40.40	220.00	20			
	30	42.31	206.50	41.57	211.30	41.23	216.05	40.47	220.70	30			
	40	42.39	207.20	42.5	211.95	41.31	216.75	40.53	221.40	40			
	50	42.47	207.85	42.13	212.65	41.38	217.40	41.2	222.10	50			
56	0	42.55	208.50	42.21	213.35	41.46	218.10	41.10	222.80	0	56		
	10	43.2	209.20	42.28	214.00	41.54	218.80	41.18	223.55	10			
	20	43.10	209.85	42.36	214.70	42.1	219.50	41.25	224.25	20			
	30	43.18	210.50	42.44	215.35	42.9	220.20	41.33	224.95	30			
	40	43.26	211.20	42.52	216.05	42.17	220.90	41.41	225.65	40			
	50	43.34	211.85	43.0	216.70	42.24	221.60	41.49	226.35	50			
57	0	43.42	212.50	43.7	217.40	42.32	222.30	41.56	227.05	0	57		
	10	43.50	213.20	43.15	218.10	42.40	222.95	42.4	227.80	10			
	20	43.58	213.85	43.23	218.75	42.47	223.65	42.11	228.50	20			
	30	44.5	214.50	43.31	219.45	42.55	224.35	42.19	229.20	30			
	40	44.13	215.20	43.38	220.15	43.3	225.05	42.26	229.90	40			
	50	44.21	215.85	43.46	220.80	43.10	225.75	42.34	230.60	50			
58	0	44.29	216.50	43.54	221.50	43.18	226.45	42.41	231.30	0	58		
	10	44.37	217.20	44.2	222.20	43.26	227.15	42.49	232.05	10			
	20	44.45	217.85	44.9	222.85	43.33	227.85	42.56	232.75	20			
	30	44.53	218.50	44.17	223.55	43.41	228.55	43.4	233.45	30			
	40	45.1	219.20	44.25	224.20	43.49	229.20	43.11	234.15	40			
	50	45.3	219.85	44.33	224.90	43.56	229.90	43.19	234.85	50			
59	0	45.16	220.50	44.41	225.60	44.4	230.60	43.26	235.50	0	59		
	10	45.24	221.20	44.48	226.25	44.12	231.30	43.34	236.30	10			
	20	45.32	221.85	44.58	226.95	44.19	232.00	43.41	237.00	20			
	30	45.40	222.50	45.4	227.65	44.27	232.70	43.49	237.70	30			
	40	45.48	223.20	45.12	228.30	44.35	233.40	43.56	238.40	40			
	50	45.55	223.85	45.20	229.00	44.42	234.10	44.4	239.10	50			
60	0	46.4	224.50	45.27	229.65	44.50	234.80	44.11	239.80	0	60		
	10	46.11	225.20	45.35	230.35	44.58	235.45	44.19	240.55	10			
	20	46.19	225.85	45.43	231.05	45.5	236.15	44.27	241.25	20			
	30	46.27	226.50	45.51	231.70	45.13	236.85	44.35	241.95	30			
	40	46.35	227.20	45.59	232.40	45.21	237.55	44.42	242.65	40			
	50	46.43	227.85	46.6	233.10	45.28	238.25	44.49	243.35	50			
61	0	46.51	228.50	46.14	233.75	45.36	238.95	44.57	244.05	0	61		
	10	46.59	229.20	46.22	234.45	45.44	239.65	45.4	244.80	10			
	20	47.7	229.85	46.30	235.15	45.51	240.35	45.12	245.50	20			
	30	47.15	230.50	46.38	235.80	45.59	241.00	45.19	246.10	30			
	40	47.23	231.20	46.45	236.50	46.7	241.65	45.27	246.90	40			
	50	47.31	231.85	46.53	237.20	46.14	242.40	45.34	247.60	50			
62	0	47.39	232.50	47.1	237.85	46.22	243.10	45.42	248.35	0	62		
	M	S	Loga- rithms.	M	S	Loga- rithms.	M	S	Loga- rithms.	M	S	Loga- rithms.	
Moon's Hor. Par.			38°			39°			40°			41°	Moon's Hor. Par.

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		43°			43°			44°			45°			Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.		Corr.	Loga- rithms.		Corr.	Loga- rithms.		Corr.	Loga- rithms.		S	M
		M	S		M	S		M	S		M	S			
53	0	38,20	214,45		37,44	218,75		38,8	223,00		36,32	227,20		0	53
	10	38,27	215,15		37,51	219,50		37,15	223,75		36,39	227,95		10	
	20	38,34	215,90		37,59	220,25		37,23	224,50		36,46	228,70		20	
	30	38,42	216,90		38,6	220,95		37,30	225,25		36,53	229,50		30	
	40	38,49	217,35		38,13	221,70		37,37	226,00		37,0	230,25		40	
	50	38,57	218,05		38,21	222,40		37,44	226,75		37,7	231,00		50	
54	0	39,4	218,80		38,28	223,20		37,52	227,50		37,14	231,75		0	54
	10	39,12	219,50		38,35	223,90		37,59	228,25		37,21	232,50		10	
	20	39,19	220,20		38,43	224,65		38,6	229,00		37,28	233,30		20	
	30	39,27	220,95		38,50	225,40		38,13	229,75		37,35	234,05		30	
	40	39,34	221,65		38,57	226,10		38,20	230,50		37,42	234,80		40	
	50	39,42	222,40		39,5	226,85		38,24	231,25		37,49	235,55		50	
55	0	39,49	223,10		39,12	227,60		38,35	232,00		37,56	236,30		0	55
	10	39,57	223,85		39,19	228,40		38,42	232,75		38,4	237,10		10	
	20	40,4	224,55		39,27	229,05		38,49	233,45		38,11	237,85		20	
	30	40,12	225,30		39,34	229,80		38,56	234,20		38,18	238,60		30	
	40	40,19	226,00		39,41	230,50		39,4	234,95		38,25	239,35		40	
	50	40,27	226,75		39,49	231,25		39,11	235,70		38,32	240,15		50	
56	0	40,34	227,45		39,56	232,00		39,18	236,45		38,39	240,90		0	56
	10	40,41	228,15		40,3	232,70		39,25	237,20		38,46	241,65		10	
	20	40,49	228,90		40,11	233,45		39,32	237,95		38,53	242,40		20	
	30	40,56	229,60		40,18	234,20		39,40	238,70		39,0	243,20		30	
	40	41,3	230,30		40,25	234,90		39,47	239,45		39,7	243,95		40	
	50	41,11	231,05		40,33	235,65		39,54	240,25		39,14	244,70		50	
57	0	41,18	231,75		40,40	236,40		40,1	240,95		39,21	245,45		0	57
	10	41,26	232,50		40,47	237,10		40,8	241,70		39,29	246,20		10	
	20	41,33	233,10		40,55	237,85		40,15	242,45		39,36	247,00		20	
	30	41,40	233,95		41,2	238,60		40,23	243,20		39,43	247,75		30	
	40	41,48	234,65		41,9	239,30		40,30	243,95		39,50	248,50		40	
	50	41,55	235,40		41,17	240,05		40,37	244,70		39,57	249,25		50	
58	0	42,3	236,10		41,24	240,80		40,44	245,45		40,4	250,00		0	58
	10	42,10	236,85		41,31	241,55		40,51	246,20		40,11	250,80		10	
	20	42,17	237,55		41,39	242,25		40,59	246,95		40,18	251,55		20	
	30	42,25	238,30		41,46	243,00		41,6	247,70		40,25	252,30		30	
	40	42,32	239,00		41,53	243,75		41,13	248,45		40,32	253,05		40	
	50	42,40	239,75		42,1	244,50		41,20	249,20		40,39	253,75		50	
59	0	42,47	240,45		42,8	245,25		41,27	249,95		40,46	254,60		0	59
	10	42,54	241,15		42,15	245,95		41,35	250,70		40,54	255,35		10	
	20	43,2	241,85		42,23	246,70		41,42	251,45		41,1	256,10		20	
	30	43,9	242,60		42,30	247,45		41,49	252,20		41,8	256,95		30	
	40	43,17	243,30		42,37	248,15		41,56	252,95		41,15	257,65		40	
	50	43,24	244,05		42,44	248,90		42,3	253,70		41,22	258,40		50	
60	0	43,32	244,75		42,52	249,65		42,11	254,45		41,29	259,15		0	60
	10	43,39	245,50		42,59	250,35		42,18	255,20		41,36	259,95		10	
	20	43,47	246,20		43,6	251,10		42,25	255,95		41,43	260,70		20	
	30	43,54	246,95		43,14	251,85		42,32	256,70		41,50	261,45		30	
	40	44,2	247,65		43,21	252,55		42,39	257,45		41,57	262,20		40	
	50	44,9	248,40		43,28	253,30		42,47	258,20		42,4	263,00		50	
61	0	44,17	249,10		43,36	254,05		42,54	258,95		42,11	263,75		0	61
	10	44,24	249,85		43,43	254,80		42,1	259,70		42,18	264,50		10	
	20	44,32	250,50		43,50	255,50		42,8	260,45		42,25	265,25		20	
	30	44,39	251,30		43,58	256,25		42,15	261,20		42,32	266,05		30	
	40	44,46	252,00		44,5	257,00		42,23	261,95		42,39	266,80		40	
	50	44,54	252,75		44,12	257,75		42,30	262,70		42,46	267,55		50	
62	0	45,1	253,45		44,19	258,50		42,37	263,45		42,53	268,30		0	62
M	S	M	S	Loga- rithms.	M	S	Loga- rithms.	M	S	Loga- rithms.	M	S	Loga- rithms.	M	S
Moon's Hor. Par.														Moon's Hor. Par.	
		42°			43°			44°			45°				

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		46°		47°		48°		49°		Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	S	M
53	0	35.54	231.30	35.16	235.30	34.37	239.25	33.57	243.15	0	53
	10	36.1	232.05	35.22	236.05	34.43	240.05	34.4	243.95	10	
	20	36.8	232.80	35.29	236.85	34.50	240.85	34.10	244.75	20	
	30	36.15	233.60	35.36	237.65	34.56	241.65	34.17	245.55	30	
	40	36.22	234.35	35.43	238.45	35.3	242.45	34.23	246.40	40	
	50	36.29	235.10	35.50	239.20	35.10	243.25	34.30	247.20	50	
54	0	36.35	235.90	35.56	240.00	35.17	244.05	34.36	248.00	0	54
	10	36.42	236.65	36.3	240.80	35.23	244.85	34.43	248.80	10	
	20	36.49	237.45	36.10	241.60	35.30	245.65	34.49	249.60	20	
	30	36.56	238.20	36.17	242.35	35.37	246.45	34.56	250.45	30	
	40	37.3	239.00	36.24	243.15	35.43	247.25	35.2	251.25	40	
	50	37.10	239.75	36.31	243.95	35.50	248.05	35.9	252.05	50	
55	0	37.17	240.55	36.37	244.75	35.57	248.85	35.16	252.85	0	55
	10	37.24	241.30	36.44	245.55	36.3	249.65	35.22	253.70	10	
	20	37.31	242.10	36.51	246.30	36.10	250.45	35.29	254.50	20	
	30	37.38	242.75	36.58	247.10	36.17	251.25	35.35	255.30	30	
	40	37.45	243.65	37.5	247.90	36.33	252.05	35.42	256.10	40	
	50	37.52	244.40	37.12	248.70	36.30	252.85	35.48	251.95	50	
56	0	37.59	245.20	37.18	249.45	36.37	253.65	35.55	257.75	0	56
	10	38.6	246.00	37.25	250.25	36.43	254.45	36.1	258.55	10	
	20	38.13	246.75	37.32	251.05	36.50	255.25	36.8	259.35	20	
	30	38.20	247.55	37.39	251.80	36.57	256.05	36.14	260.20	30	
	40	38.27	248.30	37.46	252.60	37.3	256.85	36.21	261.00	40	
	50	38.34	249.10	37.53	253.40	37.10	257.65	36.28	261.80	50	
57	0	38.41	249.85	37.59	254.20	37.17	258.45	36.34	262.60	0	57
	10	38.47	250.65	38.6	254.95	37.23	259.25	36.41	263.45	10	
	20	38.55	251.40	38.13	255.75	37.30	260.05	36.47	264.25	20	
	30	39.1	252.20	38.20	256.55	37.37	260.85	36.54	265.05	30	
	40	39.8	252.95	38.27	257.35	37.43	261.65	37.1	265.85	40	
	50	39.15	253.75	38.34	258.15	37.50	262.45	37.7	266.70	50	
58	0	39.22	254.50	38.40	258.90	37.57	263.25	37.14	267.50	0	58
	10	39.29	255.30	38.47	259.70	38.3	264.05	37.20	268.30	10	
	20	39.36	256.05	38.54	260.50	38.10	264.85	37.27	269.10	20	
	30	39.43	256.85	39.1	261.25	38.17	265.65	37.33	269.95	30	
	40	39.50	257.60	39.8	262.05	38.23	266.45	37.40	270.75	40	
	50	39.57	258.40	39.15	262.85	38.30	267.25	37.46	271.55	50	
59	0	40.4	259.15	39.21	263.65	38.37	268.05	37.53	272.35	0	59
	10	40.11	259.95	39.28	264.40	38.43	268.85	37.59	273.20	10	
	20	40.18	260.70	39.35	265.20	38.50	269.65	38.6	274.00	20	
	30	40.25	261.50	39.42	266.00	38.57	270.45	38.13	274.80	30	
	40	40.32	262.25	39.49	266.75	39.4	271.25	38.19	275.60	40	
	50	40.39	263.05	39.56	267.55	39.11	272.05	38.26	276.40	50	
60	0	40.46	263.80	40.2	268.35	39.18	272.85	38.32	277.25	0	60
	10	40.52	264.60	40.9	269.15	39.24	273.65	38.39	278.05	10	
	20	40.59	265.35	40.16	269.95	39.31	274.45	38.45	278.85	20	
	30	41.6	266.15	40.23	270.70	39.38	275.25	38.52	279.65	30	
	40	41.13	266.90	40.30	271.50	39.44	276.05	38.59	280.50	40	
	50	41.20	267.70	40.37	272.30	39.51	276.85	39.5	281.30	50	
61	0	41.27	268.45	40.43	273.10	39.58	277.65	39.12	282.10	0	61
	10	41.35	269.25	40.50	273.85	40.4	278.45	39.18	282.90	10	
	20	41.41	270.00	40.57	274.65	40.11	279.25	39.25	283.75	20	
	30	41.48	270.80	41.4	275.95	40.18	280.05	39.31	284.55	30	
	40	41.55	271.55	41.11	276.20	40.24	280.85	39.38	285.35	40	
	50	42.2	272.35	41.18	277.00	40.31	281.65	39.44	286.15	50	
62	0	42.9	273.10	41.24	277.80	40.38	282.45	39.51	287.00	0	62
M S		M S	Loga- rithms.	M S	Loga- rithms.	M S	Loga- rithms.	M S	Loga- rithms.	S M	
Moon's Hor. Par.		Corr.		Corr.		Corr.		Corr.		Moon's Hor. Par.	
		46°		47°		48°		49°			

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		50°		51°		52°		53°		Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.	M	S	Corr.	Loga- rithms.	M	S	Corr.	Loga- rithms.
53	0	33.16	246.95	33.35	250.70	31.54	254.35	31.11	257.90	0	53
	10	33.22	247.75	32.41	251.55	32.0	255.20	31.17	258.75	10	
	20	33.29	248.60	32.47	252.40	32.6	256.05	31.23	259.60	20	
	30	33.35	249.40	32.54	253.20	32.12	256.90	31.29	260.45	30	
	40	33.42	250.25	33.0	254.05	32.18	257.70	31.35	261.30	40	
	50	33.48	251.05	33.6	254.90	32.24	258.55	31.41	262.15	50	
54	0	33.55	251.90	33.13	255.70	32.30	259.40	31.47	263.05	0	54
	10	34.1	252.70	33.19	256.55	32.37	260.25	31.53	263.90	10	
	20	34.8	253.50	33.25	257.40	32.43	261.10	31.59	264.75	20	
	30	34.14	254.35	33.32	258.20	32.49	261.95	32.5	265.60	30	
	40	34.21	255.15	33.38	259.05	32.55	262.80	32.11	266.45	40	
	50	34.27	256.00	33.44	259.90	33.1	263.65	32.17	267.30	50	
55	0	34.34	256.80	33.51	260.70	33.7	264.50	32.23	268.15	0	55
	10	34.40	257.65	33.57	261.55	33.14	265.35	32.25	269.05	10	
	20	34.47	258.45	34.3	262.40	33.20	266.20	32.35	269.90	20	
	30	34.53	259.30	34.10	263.20	33.26	267.00	32.41	270.75	30	
	40	34.59	260.10	34.16	264.05	33.32	267.85	32.47	271.69	40	
	50	35.6	260.95	34.22	264.90	33.38	268.70	32.53	272.45	50	
56	0	35.21	261.75	34.29	265.70	33.44	269.55	32.59	273.30	0	56
	10	35.19	262.60	34.35	266.55	33.51	270.40	33.6	274.20	10	
	20	35.25	263.40	34.41	267.40	33.57	271.25	33.12	275.05	20	
	30	35.31	264.25	34.48	268.20	34.3	272.10	33.18	275.90	30	
	40	35.38	265.05	34.54	269.05	34.9	272.95	33.24	276.75	40	
	50	35.44	265.95	35.0	269.90	34.15	273.80	33.30	277.60	50	
57	0	35.51	266.70	35.6	270.70	34.21	274.65	33.36	278.45	0	57
	10	35.57	267.55	35.12	271.55	34.28	275.50	33.42	279.30	10	
	20	36.3	268.35	35.19	272.40	34.34	276.35	33.48	280.20	20	
	30	36.10	269.20	35.25	273.20	34.40	277.15	33.54	281.05	30	
	40	36.16	270.00	35.31	274.05	34.46	278.00	34.0	281.90	40	
	50	36.22	270.85	35.37	274.90	34.52	278.85	34.6	282.75	50	
58	0	36.29	271.65	35.44	275.70	34.58	279.70	34.12	283.60	0	58
	10	36.35	272.50	35.50	276.55	35.5	280.55	34.18	284.34	10	
	20	36.42	273.30	35.56	277.40	35.11	281.40	34.24	285.30	20	
	30	36.48	274.15	36.3	278.20	35.17	282.25	34.30	286.20	30	
	40	36.55	274.95	36.9	279.05	35.23	283.10	34.36	287.05	40	
	50	37.1	275.80	36.15	279.90	35.29	283.95	34.42	287.90	50	
59	0	37.8	276.60	36.22	280.75	35.35	284.80	34.48	288.75	0	59
	10	37.14	277.45	36.28	281.55	35.42	285.65	34.54	289.60	10	
	20	37.21	278.25	36.34	282.40	35.48	286.50	35.0	290.45	20	
	30	37.27	279.10	36.41	283.25	35.54	287.35	35.6	291.30	30	
	40	37.33	279.90	36.47	284.05	36.0	288.20	35.12	292.20	40	
	50	37.40	280.75	36.53	284.90	36.6	289.05	35.18	293.05	50	
60	0	37.46	281.55	37.0	285.75	36.12	289.90	35.24	293.90	0	60
	10	37.43	282.40	37.6	286.55	36.19	290.75	35.30	294.75	10	
	20	37.59	283.20	37.12	287.40	36.25	291.60	35.36	295.60	20	
	30	38.6	284.05	37.18	288.25	36.31	292.40	35.42	296.45	30	
	40	38.12	284.85	37.25	289.05	36.37	293.25	35.48	297.30	40	
	50	38.19	285.70	37.31	289.90	36.43	294.10	35.54	298.20	50	
61	0	38.25	286.50	37.37	290.75	36.49	294.95	36.0	299.05	0	61
	10	38.32	287.35	37.44	291.60	36.56	295.80	36.6	299.90	10	
	20	38.38	288.15	37.50	292.40	37.2	296.65	36.12	300.75	20	
	30	38.44	289.00	37.56	293.25	37.8	297.50	36.18	301.60	30	
	40	38.50	289.80	38.3	294.10	37.14	298.35	36.24	302.45	40	
	50	38.57	290.65	38.9	294.95	37.20	299.20	36.30	303.30	50	
62	0	39.3	291.45	38.15	295.80	37.26	300.05	36.36	304.20	0	62
M	S	M	S	M	S	M	S	M	S	M	S
Moon's Hor. Par.		Corr.		Loga- rithms.		Corr.		Loga- rithms.		Moon's Hor. Par.	
				50°				51°			
								52°			
								53°			

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		54°		55°		56°		57°		Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	S	M
53	0	30,28	261,35	29,44	264,25	29,0	268,05	28,15	271,90	0	53
	10	30,34	262,20	29,54	265,30	29,6	268,95	28,20	272,20	10	
	20	30,40	263,10	29,56	266,50	29,11	269,85	28,26	273,10	20	
	30	30,46	263,95	30,1	267,40	29,17	270,70	28,31	274,00	30	
	40	30,52	264,35	30,7	268,25	29,22	271,60	28,37	274,90	40	
	50	30,58	265,70	30,13	269,15	29,28	272,50	28,42	275,80	50	
54	0	31,3	266,60	30,19	270,05	29,33	273,40	28,48	276,70	0	54
	10	31,9	267,45	30,24	270,90	29,39	274,30	28,53	277,60	10	
	20	31,15	268,30	30,30	271,80	29,45	275,20	28,59	278,50	20	
	30	31,21	269,20	30,31	272,65	29,50	276,05	29,4	279,40	30	
	40	31,27	270,05	30,41	273,55	29,56	276,95	29,9	280,30	40	
	50	31,33	270,90	30,47	274,40	30,1	277,85	29,15	281,20	50	
55	0	31,39	271,80	30,53	275,30	30,7	278,75	29,20	282,10	0	55
	10	31,44	272,65	30,59	276,20	30,12	279,60	29,26	283,00	10	
	20	31,50	273,50	31,4	277,05	30,18	280,50	29,31	283,90	20	
	30	31,51	274,40	31,10	277,95	30,24	281,40	29,36	284,80	30	
	40	32,2	275,25	31,16	278,85	30,29	282,30	29,42	285,70	40	
	50	32,8	276,10	31,22	279,70	30,35	283,15	29,47	286,60	50	
56	0	32,14	277,00	31,28	280,60	30,41	284,05	29,53	287,50	0	56
	10	32,20	277,85	31,33	281,45	30,46	284,95	29,58	288,40	10	
	20	32,21	278,75	31,39	282,35	30,52	285,85	30,4	289,30	20	
	30	32,31	279,60	31,45	283,20	30,57	286,75	30,9	290,20	30	
	40	32,37	280,45	31,50	284,10	31,3	287,65	30,15	291,10	40	
	50	32,43	281,35	31,56	284,95	31,8	288,50	30,20	292,00	50	
57	0	32,49	282,20	32,2	285,85	31,14	289,40	30,26	292,90	0	57
	10	32,55	283,05	32,8	286,75	31,19	290,30	30,31	293,80	10	
	20	33,1	283,95	32,13	287,60	31,25	291,20	30,37	294,70	20	
	30	33,7	284,80	32,19	288,50	31,31	292,10	30,42	295,60	30	
	40	33,13	285,65	32,25	289,35	31,36	293,00	30,47	296,50	40	
	50	33,18	286,55	32,30	290,25	31,42	293,85	30,53	297,40	50	
58	0	33,24	287,40	32,36	291,15	31,48	294,75	30,58	298,30	0	58
	10	33,30	288,30	32,42	292,00	31,53	295,65	31,4	299,20	10	
	20	33,31	289,15	32,48	292,90	31,59	296,55	31,9	300,10	20	
	30	33,42	290,00	32,53	293,75	32,4	297,45	31,15	301,00	30	
	40	33,48	290,90	32,59	294,65	32,10	298,35	31,20	301,90	40	
	50	33,54	291,75	33,5	295,55	32,15	299,20	31,26	302,80	50	
59	0	34,0	292,65	33,11	296,40	32,21	300,10	31,31	303,70	0	59
	10	34,5	293,50	33,16	297,30	32,27	301,00	31,37	304,60	10	
	20	34,11	294,40	33,22	298,15	32,32	301,90	31,42	305,50	20	
	30	34,17	295,25	33,28	299,05	32,38	302,80	31,48	306,40	30	
	40	34,23	296,10	33,33	299,90	32,43	303,65	31,53	307,30	40	
	50	34,29	297,00	33,39	300,80	32,49	304,55	31,58	308,20	50	
60	0	34,33	297,85	33,45	301,70	32,55	305,45	32,4	309,10	0	60
	10	34,40	298,70	33,51	302,55	33,0	306,35	32,9	310,00	10	
	20	34,46	299,60	33,47	303,45	33,6	307,25	32,15	310,90	20	
	30	34,52	300,45	34,3	304,35	33,11	308,15	32,20	311,80	30	
	40	34,58	301,30	34,8	305,20	33,17	309,00	32,26	312,70	40	
	50	35,4	302,20	34,14	306,10	33,22	309,90	32,31	313,60	50	
61	0	35,10	303,05	34,20	307,00	33,28	310,80	32,36	314,50	0	61
	10	35,15	303,95	34,25	307,85	33,34	311,70	32,42	315,40	10	
	20	35,21	304,80	34,31	308,75	33,39	312,60	32,47	316,30	20	
	30	35,27	305,70	34,37	309,60	33,45	313,45	32,53	317,20	30	
	40	35,33	306,55	34,42	310,50	33,50	314,35	32,58	318,10	40	
	50	35,39	307,45	34,48	311,35	33,50	315,25	33,4	319,00	50	
62	0	35,45	308,30	34,54	312,25	34,2	316,15	33,9	319,90	0	62
M. S.		M. S.	Loga- rithms.	M. S.	Loga- rithms.	M. S.	Loga- rithms.	M. S.	Loga- rithms.	S. M.	
Moon's Hor. Par.		Corr.		Corr.		Corr.		Corr.		Moon's Hor. Par.	
		54°		55°		56°		57°			

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		58°		59°		60°		61°		Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	S	M
58	0	27,30	274,40	26,44	277,45	25,57	280,40	25,10	283,25	0	53
	10	27,35	275,30	26,49	278,40	26, 2	281,30	25,15	284,20	10	
	20	27,40	276,20	26,54	279,30	26, 7	282,25	25,20	285,15	20	
	30	27,46	277,10	26,59	280,20	26,12	283,15	25,25	286,05	30	
	40	27,51	278,05	27, 4	281,15	26,17	284,10	25,30	287,00	40	
	50	27,56	278,95	27, 9	282,05	26,22	285,00	25,35	287,95	50	
54	0	28, 1	279,85	27,14	282,95	26,27	285,95	25,39	288,90	0	54
	10	28, 7	280,70	27,20	283,90	26,32	286,85	25,44	289,80	10	
	20	28,12	281,70	27,25	284,80	26,37	287,80	25,49	290,75	20	
	30	28,17	282,60	27,30	285,75	26,42	288,75	25,55	291,70	30	
	40	28,23	283,50	27,35	286,65	26,47	289,65	25,59	292,65	40	
	50	28,28	284,40	27,40	287,55	26,52	290,60	26, 3	293,55	50	
56	0	28,33	285,30	27,45	288,50	26,57	291,55	26, 8	294,50	0	55
	10	28,38	286,25	27,50	289,40	27, 2	292,45	26,13	295,45	10	
	20	28,44	287,15	27,56	290,30	27, 7	293,40	26,18	296,40	20	
	30	28,49	288,05	28, 1	291,25	27,12	294,30	26,23	297,30	30	
	40	28,54	288,95	28, 6	292,15	27,17	295,25	26,28	298,25	40	
	50	29, 0	289,85	28,11	293,05	27,22	296,15	26,33	299,20	50	
56	0	29, 5	290,80	28,16	294,00	27,27	297,10	26,37	300,15	0	56
	10	29,10	291,70	28,22	294,90	27,32	298,05	26,42	301,10	10	
	20	29,16	292,60	28,27	295,85	27,37	298,95	26,47	302,05	20	
	30	29,21	293,50	28,32	296,75	27,42	299,90	26,52	303,00	30	
	40	29,26	294,40	28,37	297,70	27,47	300,80	26,57	303,90	40	
	50	29,31	295,35	28,42	298,60	27,52	301,75	27, 2	304,85	50	
57	0	29,37	296,25	28,47	299,55	27,57	302,70	27, 6	305,75	0	57
	10	29,42	297,15	28,53	300,45	28, 2	303,60	27,11	306,70	10	
	20	29,47	298,05	28,58	301,35	28, 7	304,55	27,16	307,65	20	
	30	29,53	298,95	29, 3	302,30	28,12	305,45	27,21	308,60	30	
	40	29,58	299,90	29, 8	303,20	28,17	306,40	27,26	309,50	40	
	50	30, 3	300,80	29,13	304,10	28,22	307,30	27,31	310,45	50	
58	0	30, 9	301,70	29,18	305,05	28,27	308,25	27,35	311,40	0	58
	10	30,14	302,60	29,24	305,95	28,32	309,20	27,40	312,35	10	
	20	30,19	303,50	29,29	306,85	28,37	310,10	27,45	313,25	20	
	30	30,24	304,45	29,34	307,80	28,42	311,05	27,50	314,20	30	
	40	30,30	305,35	29,39	308,70	28,47	312,00	27,55	315,15	40	
	50	30,35	306,25	29,44	309,60	28,52	312,50	28, 0	316,10	50	
59	0	30,40	307,15	29,49	310,55	28,57	313,45	28, 4	317,00	0	59
	10	30,45	308,05	29,55	311,45	29, 2	314,35	28, 9	317,95	10	
	20	30,51	309,00	30, 0	312,35	29, 7	315,25	28,14	318,90	20	
	30	30,56	309,90	30, 5	313,30	29,12	316,60	28,19	319,85	30	
	40	31, 1	310,80	30,10	314,20	29,17	317,55	28,24	320,80	40	
	50	31, 6	311,70	30,15	315,15	29,22	318,50	28,29	321,70	50	
60	0	31,12	312,60	30,20	316,05	29,27	319,40	28,34	322,65	0	60
	10	31,17	313,55	30,26	317,00	29,32	320,35	28,39	323,60	10	
	20	31,22	314,45	30,31	317,90	29,37	321,30	28,44	324,55	20	
	30	31,28	315,35	30,36	318,85	29,42	322,20	28,49	325,50	30	
	40	31,33	316,25	30,41	319,75	29,47	323,15	28,54	326,40	40	
	50	31,38	317,15	30,46	320,65	29,52	324,10	28,59	327,35	50	
61	0	31,44	318,10	30,51	321,60	29,57	325,00	29, 3	328,30	0	61
	10	31,49	319,00	30,57	322,50	30, 2	325,95	29, 8	329,25	10	
	20	31,54	319,90	31, 2	323,40	30, 7	326,90	29,13	330,20	20	
	30	31, 0	320,80	31, 7	324,35	30,12	327,80	29,18	331,10	30	
	40	31, 5	321,70	31,12	325,25	30,17	328,75	29,23	332,05	40	
	50	32,10	322,60	31,17	326,15	30,22	329,70	29,28	333,00	50	
62	0	32,16	323,55	31,22	327,10	30,27	330,60	29,32	333,95	0	62
M S	M S	M S	Loga- rithms.	M S	Loga- rithms.	M S	Loga- rithms.	M S	Loga- rithms.	S M	S M
Hor. Par.	Hor. Par.	Hor. Par.	Corr.	Hor. Par.	Corr.	Hor. Par.	Corr.	Hor. Par.	Corr.	Hor. Par.	Corr.
			58°				59°				61°

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		62°		63°		64°		65°		Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	S	M
53	0	24,22	286,05	23,35	283,80	22,46	291,40	21,57	293,95	0	53
	10	24,27	287,00	23,39	289,75	22,50	292,36	22,1	294,90	10	
	20	24,32	287,95	23,44	290,70	22,55	293,30	22,5	295,85	20	
	30	24,36	288,90	23,48	291,65	22,59	294,30	22,10	296,85	30	
	40	24,41	289,85	23,53	292,60	23,3	295,25	22,14	297,80	40	
	50	24,46	290,80	23,57	293,55	23,8	296,20	22,18	298,75	50	
54	0	24,51	291,75	24,2	294,50	23,12	297,15	22,23	299,75	0	54
	10	24,55	292,70	24,6	295,45	23,17	298,10	22,27	300,70	10	
	20	25,0	293,65	24,11	296,40	23,21	299,10	22,31	301,70	20	
	30	25,5	294,55	24,13	297,35	23,26	300,05	22,36	302,65	30	
	40	25,9	295,50	24,20	298,30	23,30	301,00	22,40	303,65	40	
	50	25,14	296,45	24,24	299,25	23,34	301,95	22,44	304,60	50	
55	0	25,19	297,40	24,29	300,20	23,39	302,95	22,48	305,60	0	55
	10	25,23	298,35	24,33	301,15	23,43	303,95	22,52	306,55	10	
	20	25,28	299,30	24,38	302,15	23,47	304,85	22,57	307,50	20	
	30	25,32	300,25	24,42	303,10	23,52	305,80	23,1	308,50	30	
	40	25,37	301,20	24,47	304,05	23,56	306,60	23,5	309,45	40	
	50	25,42	302,15	24,51	305,00	24,0	307,75	23,9	310,45	50	
56	0	25,47	303,10	24,56	305,95	24,5	308,70	23,13	311,40	0	56
	10	25,51	304,05	25,0	306,95	24,9	309,65	23,18	312,35	10	
	20	25,56	305,00	25,5	307,85	24,13	310,65	23,22	313,35	20	
	30	26,1	305,90	25,9	308,80	24,18	311,60	23,26	314,30	30	
	40	26,5	306,85	25,14	309,75	24,22	312,55	23,31	315,25	40	
	50	26,10	307,80	25,19	310,70	24,26	313,50	23,35	316,25	50	
57	0	26,15	308,75	25,23	311,70	24,31	314,50	23,39	317,20	0	57
	10	26,19	309,70	25,28	312,65	24,35	315,45	23,43	318,20	10	
	20	26,24	300,65	25,32	313,60	24,40	316,40	23,47	319,15	20	
	30	26,29	311,60	25,37	314,55	24,44	317,40	23,52	320,10	30	
	40	26,33	312,55	25,42	315,50	24,49	318,35	23,56	321,10	40	
	50	26,38	313,50	25,46	316,45	24,53	319,30	24,0	322,05	50	
58	0	26,43	314,45	25,51	317,40	24,58	320,30	24,4	323,05	0	58
	10	26,47	315,40	25,55	318,40	25,2	321,25	24,8	324,00	10	
	20	26,52	316,35	26,0	319,35	25,6	322,20	24,13	325,00	20	
	30	26,57	317,30	26,4	320,30	25,11	323,15	24,17	325,95	30	
	40	27,1	318,25	26,9	321,25	25,15	324,15	24,21	326,95	40	
	50	27,6	319,20	26,13	322,20	25,19	325,10	24,25	327,90	50	
59	0	27,11	320,15	26,18	323,15	25,24	326,05	24,30	328,90	0	59
	10	27,15	321,10	26,22	324,10	25,28	327,05	24,34	329,85	10	
	20	27,20	322,00	26,27	325,10	25,32	328,00	24,38	330,80	20	
	30	27,25	322,95	26,31	326,05	25,37	328,95	24,42	331,75	30	
	40	27,30	323,90	26,36	327,00	25,41	329,90	24,47	332,75	40	
	50	27,35	324,85	26,40	327,95	25,45	330,90	24,51	333,75	50	
60	0	27,40	325,80	26,45	328,95	25,50	331,85	24,55	334,70	0	60
	10	27,44	326,75	26,49	329,85	25,54	332,80	24,59	335,70	10	
	20	27,49	327,70	26,54	330,80	25,59	333,80	25,3	336,65	20	
	30	27,54	328,65	26,58	331,75	26,3	334,75	25,8	337,60	30	
	40	27,58	329,60	27,3	332,70	26,8	335,70	25,12	338,60	40	
	50	28,3	330,55	27,8	333,65	26,12	336,65	25,16	339,55	50	
61	0	28,8	331,50	27,12	334,60	26,17	337,65	25,20	340,55	0	61
	10	28,12	332,45	27,17	335,55	26,21	338,60	25,24	341,50	10	
	20	28,17	333,40	27,21	336,50	26,26	339,55	25,29	342,50	20	
	30	28,22	334,35	27,26	337,50	26,30	340,55	25,33	343,45	30	
	40	28,26	335,30	27,31	338,45	26,34	341,50	25,37	344,45	40	
	50	28,31	336,25	27,35	339,40	26,39	342,45	25,41	345,40	50	
62	0	28,36	337,20	27,40	340,35	26,43	343,45	25,46	346,40	0	62
M	S	M	S	M	S	M	S	M	S	S	M
Moon's Hor. Par.		62°		63°		64°		65°		Moon's Hor. Par.	

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		66°		67°		68°		69°		Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.	M	S	Corr.	Loga- rithms.	M	S	Corr.	Loga- rithms.
53	0	21, 8	296,35	20, 18	298,65	19, 28	300,90	18, 38	303,05	0	53
	10	21, 12	297,35	20, 22	299,65	19, 32	301,90	18, 41	304,05	10	
	20	21, 16	298,30	20, 26	300,65	19, 35	302,90	18, 45	305,05	20	
	30	21, 20	299,30	20, 30	301,60	19, 39	303,90	18, 48	306,05	30	
	40	21, 24	300,25	20, 34	302,60	19, 43	304,90	18, 52	307,05	40	
	50	21, 28	301,25	20, 38	303,60	19, 47	305,90	18, 58	308,05	50	
54	0	21, 32	302,20	20, 42	304,60	19, 51	306,90	18, 59	309,10	0	54
	10	21, 36	303,20	20, 46	305,55	19, 54	307,85	19, 3	310,10	10	
	20	21, 40	304,15	20, 50	306,55	19, 58	308,85	19, 6	311,10	20	
	30	21, 45	305,15	20, 53	307,55	20, 2	309,85	19, 10	312,10	30	
	40	21, 49	306,15	20, 57	308,50	20, 6	310,85	19, 14	313,10	40	
	50	21, 53	307,10	21, 1	309,50	20, 10	311,85	19, 17	314,10	50	
55	0	21, 57	308,10	21, 5	310,50	20, 13	312,85	19, 21	315,10	0	55
	10	22, 1	309,05	21, 9	311,50	20, 17	313,80	19, 24	316,10	10	
	20	22, 5	310,05	21, 13	312,45	20, 21	314,80	19, 28	317,10	20	
	30	22, 9	311,00	21, 17	313,45	20, 24	315,80	19, 31	318,10	30	
	40	22, 13	312,00	21, 21	314,45	20, 28	316,80	19, 35	319,10	40	
	50	22, 17	313,00	21, 25	315,40	20, 32	317,80	19, 39	320,10	50	
56	0	22, 21	313,95	21, 29	316,40	20, 36	318,80	19, 42	321,10	0	56
	10	22, 25	314,95	21, 33	317,40	20, 39	319,75	19, 46	322,10	10	
	20	22, 29	315,90	21, 37	318,40	20, 43	320,75	19, 49	323,10	20	
	30	22, 34	316,90	21, 40	319,35	20, 47	321,75	19, 53	324,10	30	
	40	22, 38	317,90	21, 44	320,35	20, 50	322,75	19, 57	325,10	40	
	50	22, 42	318,85	21, 48	321,35	20, 54	323,75	20, 0	326,10	50	
57	0	22, 46	319,85	21, 52	322,35	20, 58	324,75	20, 4	327,10	0	57
	10	22, 50	320,80	21, 56	323,30	21, 2	325,70	20, 7	328,10	10	
	20	22, 54	321,80	22, 0	324,30	21, 6	326,70	20, 11	329,10	20	
	30	22, 58	322,75	22, 4	325,30	21, 9	327,70	20, 15	330,10	30	
	40	23, 2	323,75	22, 8	326,30	21, 13	328,70	20, 18	331,10	40	
	50	23, 6	324,75	22, 12	327,25	21, 17	329,70	20, 22	332,10	50	
58	0	23, 10	325,70	22, 16	328,25	21, 21	330,70	20, 25	333,10	0	58
	10	23, 14	326,70	22, 20	329,25	21, 24	331,70	20, 29	334,10	10	
	20	23, 18	327,65	22, 24	330,20	21, 28	332,70	20, 32	335,10	20	
	30	23, 22	328,65	22, 27	331,20	21, 32	333,65	20, 36	336,10	30	
	40	23, 26	329,65	22, 31	332,20	21, 35	334,65	20, 40	337,10	40	
	50	23, 30	330,60	22, 35	333,20	21, 39	335,65	20, 43	338,10	50	
59	0	23, 34	331,60	22, 39	334,15	21, 43	336,65	20, 47	339,10	0	59
	10	23, 39	332,55	22, 43	335,15	21, 47	337,65	20, 50	340,10	10	
	20	23, 43	333,55	22, 47	336,15	21, 50	338,65	20, 54	341,10	20	
	30	23, 47	334,50	22, 50	337,10	21, 54	339,65	20, 57	342,10	30	
	40	23, 51	335,50	22, 55	338,10	21, 58	340,65	21, 1	343,10	40	
	50	23, 56	336,50	22, 58	339,10	22, 2	341,65	21, 4	344,10	50	
60	0	23, 59	337,45	23, 2	340,10	22, 6	342,65	21, 8	345,10	0	60
	10	24, 3	338,45	23, 6	341,05	22, 9	343,60	21, 12	346,10	10	
	20	24, 7	339,40	23, 10	342,05	22, 13	344,60	21, 15	347,10	20	
	30	24, 11	340,40	23, 14	343,05	22, 17	345,60	21, 19	348,10	30	
	40	24, 15	341,40	23, 18	344,05	22, 21	346,60	21, 22	349,10	40	
	50	24, 19	342,35	23, 22	345,00	22, 24	347,60	21, 26	350,10	50	
61	0	24, 23	343,35	23, 26	346,00	22, 28	348,60	21, 30	351,10	0	61
	10	24, 27	344,30	23, 30	347,00	22, 32	349,60	21, 33	352,10	10	
	20	24, 31	345,30	23, 33	348,00	22, 36	350,60	21, 37	353,10	20	
	30	24, 35	346,25	23, 37	348,95	22, 39	351,60	21, 40	354,10	30	
	40	24, 39	347,25	23, 41	349,95	22, 43	352,60	21, 44	355,10	40	
	50	24, 44	348,25	23, 45	350,95	22, 47	353,60	21, 47	356,10	50	
62	0	24, 48	349,20	23, 49	351,95	22, 51	354,60	21, 51	357,10	0	62
M	S	M	S	M	S	M	S	M	S	M	S
Moon's Hor. Par.		Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Moon's Hor. Par.	
			66°		67°		68°		69°		

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		70°		71°		72°		73°		Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	S	M
53	0	17.47	305.10	16.56	307.10	16.4	308.90	15.14	310.60	0	53
	10	17.50	306.10	16.69	308.10	16.7	309.90	15.15	311.65	10	
	20	17.54	307.10	17.3	309.15	16.10	310.95	15.18	312.70	20	
	30	17.57	308.10	17.6	310.15	16.13	311.95	15.21	313.70	30	
	40	18.0	309.10	17.9	311.15	16.16	312.00	15.24	314.75	40	
	50	18.4	310.10	17.12	312.15	16.20	314.00	15.27	315.80	50	
54	0	18.7	311.15	17.15	313.15	16.23	315.05	15.30	316.80	0	54
	10	18.11	312.15	17.19	314.20	16.26	316.05	15.33	317.85	10	
	20	18.14	313.15	17.22	315.20	16.29	317.10	15.36	318.85	20	
	30	18.18	314.15	17.25	316.20	16.32	318.10	15.38	319.90	30	
	40	18.21	315.15	17.28	317.20	16.35	319.15	15.41	320.90	40	
	50	18.24	316.15	17.32	318.20	16.38	320.15	15.44	321.95	50	
55	0	18.28	317.20	17.35	319.25	16.41	321.20	15.47	322.95	0	55
	10	18.31	318.20	17.38	320.25	16.44	322.20	15.50	324.00	10	
	20	18.34	319.20	17.41	321.25	16.47	323.20	15.53	325.00	20	
	30	18.38	320.20	17.44	322.25	16.51	324.25	15.56	326.05	30	
	40	18.42	321.20	17.48	323.25	16.54	325.25	15.59	327.05	40	
	50	18.45	322.20	17.51	324.30	16.57	326.25	16.2	328.10	50	
56	0	18.49	323.25	17.54	325.30	17.0	327.25	16.5	329.10	0	56
	10	18.52	324.25	17.58	326.30	17.3	328.30	16.8	330.15	10	
	20	18.56	325.25	18.1	327.30	17.6	329.30	16.11	331.15	20	
	30	18.59	326.25	18.4	328.30	17.9	330.30	16.14	332.20	30	
	40	19.2	327.25	18.7	329.35	17.12	331.35	16.17	333.20	40	
	50	19.5	328.25	18.11	330.35	17.15	332.35	16.20	334.25	50	
57	0	19.9	329.25	18.14	331.35	17.18	333.35	16.23	335.25	0	57
	10	19.12	330.30	18.17	332.35	17.21	334.40	16.26	336.30	10	
	20	19.16	331.30	18.21	333.40	17.25	335.40	16.29	337.30	20	
	30	19.19	332.30	18.24	334.40	17.28	336.40	16.32	338.35	30	
	40	19.23	333.30	18.27	335.40	17.31	337.45	16.34	339.35	40	
	50	19.26	334.30	18.30	336.40	17.34	338.45	16.37	340.40	50	
58	0	19.30	335.30	18.33	337.45	17.37	339.45	16.40	341.40	0	58
	10	19.33	336.35	18.37	338.45	17.40	340.50	16.43	342.45	10	
	20	19.36	337.35	18.40	339.45	17.43	341.50	16.46	343.45	20	
	30	19.40	338.35	18.43	340.45	17.46	342.55	16.49	344.50	30	
	40	19.43	339.35	18.46	341.50	17.49	343.55	16.52	345.50	40	
	50	19.47	340.35	18.50	342.50	17.52	344.60	16.55	346.55	50	
59	0	19.50	341.35	18.53	343.50	17.55	345.60	16.58	347.55	0	59
	10	19.54	342.40	18.56	344.50	17.59	346.60	17.1	348.60	10	
	20	19.57	343.40	18.59	345.55	18.2	347.65	17.3	349.60	20	
	30	20.1	344.40	19.3	346.55	18.5	348.65	17.6	350.65	30	
	40	20.4	345.40	19.6	347.55	18.8	349.65	17.9	351.65	40	
	50	20.7	346.40	19.9	348.55	18.11	350.70	17.12	352.70	50	
60	0	20.11	347.40	19.12	349.60	18.14	351.70	18.15	353.70	0	60
	10	20.14	348.45	19.15	350.60	18.17	352.70	17.18	354.75	10	
	20	20.18	349.45	19.19	351.60	18.20	353.75	17.21	355.75	20	
	30	20.21	350.45	19.22	352.60	18.24	354.75	17.24	356.80	30	
	40	20.24	351.45	19.25	353.65	18.27	355.75	17.27	357.80	40	
	50	20.28	352.45	19.29	354.65	18.30	356.80	17.30	358.85	50	
61	0	20.31	353.45	19.32	355.65	18.33	357.80	17.33	359.85	0	61
	10	20.35	354.50	19.35	356.65	18.36	358.80	17.36	360.90	10	
	20	20.39	355.50	19.39	357.70	18.39	359.85	17.39	361.90	20	
	30	20.42	356.50	19.42	358.70	18.42	360.85	17.41	362.95	30	
	40	20.46	357.50	19.45	359.70	18.45	361.90	17.44	363.95	40	
	50	20.49	358.50	19.48	360.70	18.48	362.90	17.47	365.00	50	
62	0	20.51	359.50	19.52	361.75	18.51	363.95	17.50	366.00	0	62
M	S	M	S	M	S	M	S	M	S	M	S
Moon's Hor. Par.		70°		71°		72°		73°		Moon's Hor. Par.	

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		74°		75°		76°		77°		Moon's Hor. Par.	
		Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.		
M	S	M	S	M	S	M	S	M	S	S	M
53	0	14,20	312,35	13,28	313,95	12,35	315,45	11,42	316,80	0	53
	10	14,23	313,40	13,30	315,00	12,37	316,50	11,44	317,85	10	
	20	14,26	314,40	13,33	316,05	12,40	317,55	11,46	318,85	20	
	30	14,28	315,45	13,35	317,05	12,42	318,55	11,49	319,90	30	
	40	14,31	316,45	13,38	318,10	12,45	319,60	11,51	320,95	40	
	50	14,34	317,50	13,40	319,15	12,47	320,65	11,53	322,00	50	
54	0	14,37	318,50	13,43	320,15	12,50	321,65	11,56	323,00	0	54
	10	14,40	319,55	13,45	321,20	12,52	322,70	11,58	324,05	10	
	20	14,42	320,50	13,48	322,25	12,54	323,75	12, 0	325,10	20	
	30	14,45	321,60	13,51	323,25	12,57	324,75	12, 2	326,15	30	
	40	14,48	322,65	13,54	324,30	12,59	325,80	12, 5	327,20	40	
	50	14,51	323,70	13,56	325,35	12, 2	326,85	12, 7	328,20	50	
55	0	14,53	324,70	13,59	326,35	12, 4	327,85	12, 9	329,25	0	55
	10	14,56	325,75	14, 1	327,40	12, 7	328,90	12,12	330,30	10	
	20	14,59	326,80	14, 2	328,45	12, 9	329,95	12,14	331,35	20	
	30	15, 1	327,80	14, 6	329,45	12,11	331,00	12,16	332,40	30	
	40	15, 4	328,85	14, 9	330,50	12,14	332,00	12,19	333,45	40	
	50	15, 7	329,90	14,11	331,55	12,16	333,05	12,21	334,50	50	
56	0	15,10	330,00	14,14	332,55	12,19	334,10	12,22	335,55	0	56
	10	15,13	331,95	14,17	333,60	12,21	335,15	12,25	336,55	10	
	20	15,15	333,00	14,19	334,65	12,23	336,20	12,28	337,60	20	
	30	15,18	334,00	14,22	335,65	12,26	337,20	12,30	338,65	30	
	40	15,21	335,05	14,24	336,70	12,28	338,30	12,32	339,70	40	
	50	15,24	336,10	14,27	337,75	12,31	339,30	12,34	340,75	50	
57	0	15,26	337,10	14,30	338,75	12,33	340,35	12,36	341,80	0	57
	10	15,29	338,15	14,32	339,80	12,36	341,40	12,39	342,80	10	
	20	15,32	339,15	14,35	340,86	12,38	342,45	12,41	343,85	20	
	30	15,35	340,20	14,38	341,85	12,41	343,45	12,43	344,90	30	
	40	15,37	341,20	14,40	342,90	12,43	344,50	12,45	345,95	40	
	50	15,40	342,26	14,43	343,95	12,46	345,55	12,48	347,00	50	
58	0	15,43	343,25	14,46	344,95	12,48	346,60	12,50	348,05	0	58
	10	15,46	344,30	14,48	346,00	12,50	347,65	12,52	349,10	10	
	20	15,49	345,30	14,51	347,05	12,53	348,65	12,54	350,15	20	
	30	15,51	346,35	14,53	348,05	12,55	349,70	12,57	351,15	30	
	40	15,54	347,35	14,56	349,10	12,57	350,75	12,59	352,20	40	
	50	15,57	348,40	14,58	350,15	12,59	351,80	13, 1	353,25	50	
59	0	16, 0	349,40	15, 1	351,15	12, 2	352,80	13, 3	354,30	0	59
	10	16, 2	350,45	15, 4	352,20	12, 5	353,85	13, 5	355,35	10	
	20	16, 5	351,50	15, 6	353,25	12, 7	354,90	13, 8	356,40	20	
	30	16, 8	352,50	15, 9	354,25	12,10	355,95	13,10	357,45	30	
	40	16,11	353,55	15,12	355,30	12,12	357,09	13,12	358,50	40	
	50	16,13	354,60	15,14	356,35	12,15	358,00	13,14	359,55	50	
60	0	16,16	355,60	15,17	357,35	12,17	359,05	13,17	360,60	0	60
	10	16,19	356,65	15,19	358,40	12,19	360,10	13,19	361,60	10	
	20	16,22	357,65	15,22	359,45	12,22	361,15	13,21	362,65	20	
	30	16,24	358,70	15,25	360,45	12,24	362,20	13,23	363,70	30	
	40	16,27	359,70	15,27	361,50	12,27	363,20	13,26	364,75	40	
	50	16,30	360,75	15,30	362,55	12,29	364,25	13,28	365,80	50	
61	0	16,33	361,75	15,32	363,55	12,31	365,30	13,30	366,85	0	61
	10	16,35	362,80	15,35	364,60	12,34	366,35	13,32	367,90	10	
	20	16,38	363,85	15,36	365,65	12,36	367,35	13,35	368,95	20	
	30	16,41	364,85	15,38	366,70	12,39	368,40	13,37	370,00	30	
	40	16,44	365,90	15,41	367,75	12,41	369,45	13,39	371,00	40	
	50	16,46	366,95	15,44	368,75	12,44	370,50	13,41	372,05	50	
62	0	16,49	367,95	15,46	369,80	12,46	371,50	13,44	373,10	0	62
Moon's Hor. Par.		74°		75°		76°		77°		Moon's Hor. Par.	
M	S	M	S	M	S	M	S	M	S	S	M
Moon's Hor. Par.		Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Moon's Hor. Par.	

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		78°		79°		80°		81°		Moon's Hor. Par.			
M	S	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	S	M		
53	0	10,49	318,00	9,55	319,15	9,2	320,25	8,8	321,35	0	53		
	10	10,51	319,05	9,57	320,20	9,3	321,30	8,9	322,40	10			
	20	10,53	320,10	9,59	321,25	9,5	322,35	9,1	323,50	20			
	30	10,55	321,15	10,1	322,30	9,7	323,40	9,3	324,55	30			
	40	10,57	322,20	10,3	323,35	9,9	324,45	9,5	325,60	40			
	50	10,59	323,25	10,5	324,40	9,11	325,50	9,7	326,65	50			
54	0	11,2	324,30	10,7	325,45	9,13	326,55	9,9	327,70	0	54		
	10	11,4	325,35	10,9	326,50	9,14	327,60	9,10	328,75	10			
	20	11,6	326,40	10,11	327,55	9,16	328,65	9,12	329,90	20			
	30	11,8	327,45	10,13	328,60	9,18	329,70	9,14	330,95	30			
	40	11,10	328,50	10,15	329,65	9,20	330,75	9,16	332,10	40			
	50	11,12	329,55	10,17	330,70	9,21	331,80	9,17	333,25	50			
55	0	11,14	330,60	10,19	331,75	9,23	332,85	9,19	334,40	0	55		
	10	11,16	331,60	10,20	332,80	9,25	333,90	9,21	335,55	10			
	20	11,18	332,65	10,22	333,85	9,26	334,95	9,22	336,70	20			
	30	11,21	333,70	10,24	334,90	9,28	336,00	9,24	337,95	30			
	40	11,23	334,75	10,26	335,95	9,30	337,05	9,26	339,10	40			
	50	11,25	335,80	10,28	337,00	9,32	338,10	9,28	340,25	50			
56	0	11,27	336,85	10,30	338,05	9,33	339,15	9,30	341,40	0	56		
	10	11,29	337,90	10,32	339,10	9,35	340,20	9,32	342,55	10			
	20	11,31	338,95	10,34	340,15	9,37	341,25	9,34	343,70	20			
	30	11,33	340,00	10,36	341,20	9,38	342,30	9,36	344,85	30			
	40	11,35	341,05	10,38	342,25	9,40	343,35	9,38	346,00	40			
	50	11,37	342,10	10,40	343,30	9,42	344,45	9,40	347,15	50			
57	0	11,39	343,15	10,42	344,35	9,44	345,50	9,42	348,30	0	57		
	10	11,41	344,15	10,43	345,40	9,46	346,55	9,44	349,45	10			
	20	11,43	345,20	10,45	346,45	9,47	347,60	9,46	350,60	20			
	30	11,45	346,25	10,47	347,50	9,49	348,65	9,48	351,75	30			
	40	11,47	347,30	10,49	348,55	9,51	349,70	9,50	352,90	40			
	50	11,49	348,35	10,51	349,60	9,53	350,75	9,52	354,05	50			
58	0	11,51	349,40	10,53	350,65	9,54	351,80	9,54	355,20	0	58		
	10	11,53	350,45	10,55	351,70	9,56	352,85	9,56	356,35	10			
	20	11,55	351,50	10,57	352,75	9,58	353,90	9,58	357,50	20			
	30	11,58	352,55	10,58	353,80	9,59	354,95	9,59	358,65	30			
	40	12,0	353,60	11,0	354,90	10,1	356,00	9,1	359,80	40			
	50	12,2	354,65	11,2	355,95	10,3	357,10	9,3	360,95	50			
59	0	12,4	355,70	11,4	357,00	10,5	358,15	9,5	362,10	0	59		
	10	12,6	356,75	11,6	358,05	10,6	359,20	9,6	363,25	10			
	20	12,8	357,80	11,8	359,10	10,8	360,35	9,8	364,40	20			
	30	12,10	358,85	11,10	360,15	10,10	361,30	9,10	365,55	30			
	40	12,12	359,90	11,12	361,20	10,11	362,40	9,11	366,70	40			
	50	12,14	360,95	11,14	362,25	10,13	363,45	9,13	367,85	50			
60	0	12,16	362,00	11,16	363,30	10,15	364,50	9,14	368,95	0	60		
	10	12,19	363,05	11,18	364,35	10,17	365,55	9,16	369,95	10			
	20	12,21	364,10	11,20	365,40	10,18	366,60	9,17	371,00	20			
	30	12,23	365,15	11,21	366,45	10,20	367,65	9,19	372,05	30			
	40	12,25	366,20	11,23	367,50	10,22	368,70	9,21	373,10	40			
	50	12,27	367,25	11,25	368,55	10,24	369,75	9,22	374,15	50			
61	0	12,29	368,30	11,27	369,60	10,25	370,80	9,24	375,20	0	61		
	10	12,31	369,30	11,29	370,65	10,27	371,85	9,25	376,25	10			
	20	12,33	370,35	11,31	371,70	10,29	372,90	9,27	377,30	20			
	30	12,35	371,40	11,33	372,75	10,31	374,00	9,28	378,35	30			
	40	12,37	372,45	11,35	373,80	10,33	375,05	9,30	379,40	40			
	50	12,39	373,50	11,37	374,85	10,34	376,10	9,31	380,45	50			
62	0	12,41	374,55	11,39	375,90	10,36	377,15	9,33	381,50	0	62		
M	S	M	S	M	S	M	S	M	S	M	S		
Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.		
Moon's Hor. Par.	78°			79°			80°			81°			Moon's Hor. Par.

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		82°		83°		84°		85°		Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.	M	S	Corr.	Loga- rithms.	M	S	Corr.	Loga- rithms.
53	0	7.15	822.00	6.21	322.75	5.26	323.40	4.32	323.95	0	53
	10	7.16	323.05	6.22	323.85	5.27	324.45	4.33	324.00	10	
	20	7.18	324.10	6.23	324.90	5.28	325.55	4.34	325.10	20	
	30	7.19	325.20	6.25	325.95	5.29	326.60	4.35	327.15	30	
	40	7.20	326.25	6.26	327.00	5.30	327.65	4.36	328.20	40	
	50	7.22	327.30	6.27	328.05	5.31	328.70	4.37	329.25	50	
54	0	7.23	328.35	6.28	329.10	5.33	329.75	4.37	330.35	0	54
	10	7.25	329.40	6.29	330.25	5.34	330.85	4.38	331.40	10	
	20	7.26	330.50	6.30	331.25	5.35	331.90	4.39	332.45	20	
	30	7.28	331.55	6.32	332.30	5.36	332.95	4.40	333.55	30	
	40	7.29	332.60	6.33	333.35	5.37	334.00	4.41	334.60	40	
	50	7.30	333.65	6.34	334.40	5.38	335.10	4.42	335.65	50	
55	0	7.31	334.70	6.35	335.50	5.39	336.15	4.43	336.75	0	55
	10	7.33	335.80	6.36	336.55	5.40	337.20	4.44	337.80	10	
	20	7.34	336.85	6.38	337.65	5.41	338.30	4.45	338.85	20	
	30	7.36	337.90	6.39	338.70	5.42	339.35	4.46	339.95	30	
	40	7.37	338.95	6.40	339.75	5.43	340.40	4.46	341.00	40	
	50	7.39	340.00	6.41	340.80	5.44	341.45	4.47	342.05	50	
56	0	7.40	341.10	6.42	341.90	5.45	342.55	4.48	343.15	0	56
	10	7.41	342.15	6.44	342.95	5.46	343.60	4.49	344.20	10	
	20	7.42	343.20	6.45	344.00	5.47	344.70	4.50	345.25	20	
	30	7.44	344.25	6.46	345.10	5.48	345.75	4.51	346.35	30	
	40	7.45	345.30	6.47	346.15	5.49	346.80	4.52	347.40	40	
	50	7.47	346.40	6.48	347.20	5.50	347.90	4.52	348.45	50	
57	0	7.48	347.55	6.50	348.25	5.51	348.95	4.53	349.55	0	57
	10	7.49	348.50	6.52	349.35	5.53	350.05	4.54	350.60	10	
	20	7.51	349.55	6.53	350.40	5.54	351.10	4.55	351.65	20	
	30	7.52	350.60	6.54	351.45	5.55	352.15	4.56	352.70	30	
	40	7.53	351.70	6.55	352.50	5.56	353.20	4.57	353.80	40	
	50	7.55	352.75	6.56	353.60	5.57	354.30	4.58	354.85	50	
58	0	7.56	353.80	6.57	354.65	5.58	355.35	4.58	355.95	0	58
	10	7.57	354.85	6.59	355.70	5.59	356.45	4.59	357.00	10	
	20	7.59	355.95	7.0	356.75	6.0	357.50	5.0	358.05	20	
	30	8.0	357.00	7.1	357.85	6.1	358.55	5.1	359.15	30	
	40	8.2	358.05	7.2	358.90	6.2	359.65	5.2	360.20	40	
	50	8.3	359.10	7.3	359.95	6.3	360.70	5.3	361.25	50	
59	0	8.5	360.15	7.4	361.00	6.4	361.75	5.4	362.35	0	59
	10	8.6	361.25	7.6	362.10	6.5	362.80	5.5	363.40	10	
	20	8.7	362.30	7.7	363.15	6.6	363.90	5.6	364.45	20	
	30	8.9	363.35	7.8	364.20	6.7	364.95	5.6	365.50	30	
	40	8.10	364.40	7.9	365.25	6.8	366.00	5.7	366.60	40	
	50	8.11	365.45	7.10	366.35	6.9	367.05	5.8	367.65	50	
60	0	8.13	366.55	7.12	367.40	6.10	368.10	5.9	368.75	0	60
	10	8.14	367.60	7.13	368.45	6.12	369.20	5.10	369.80	10	
	20	8.16	368.65	7.14	369.50	6.13	370.25	5.10	370.85	20	
	30	8.17	369.70	7.15	370.60	6.14	371.30	5.11	371.95	30	
	40	8.18	370.75	7.16	371.65	6.15	372.40	5.12	373.00	40	
	50	8.20	371.85	7.17	372.70	6.16	373.45	5.13	374.05	50	
61	0	8.21	372.90	7.19	373.75	6.17	374.50	5.14	375.15	0	61
	10	8.22	373.95	7.20	374.85	6.18	375.60	5.15	376.20	10	
	20	8.24	375.00	7.21	375.90	6.19	376.65	5.15	377.25	20	
	30	8.25	376.05	7.22	376.95	6.20	377.70	5.16	378.35	30	
	40	8.27	377.15	7.23	378.00	6.21	378.80	5.17	379.40	40	
	50	8.28	378.20	7.25	379.10	6.22	379.85	5.18	380.45	50	
62	0	8.30	379.25	7.26	380.15	6.23	380.90	5.19	381.55	0	62
M	S	Corr.	Loga- rithms.	M	S	Corr.	Loga- rithms.	M	S	Corr.	Loga- rithms.
Moon's Hor. Par.		82°		83°		84°		85°		Moon's Hor. Par.	

Apparent Altitude of the Moon's Centre.

Moon's Hor. Par.		86°		87°		88°		89°		90°		Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	Corr.	Loga- rithms.	C.	Loga- rithms.	S	M
53	0	3.38	324.40	2.43	324.75	1.49	325.05	0.54	325.15	0.0	325.25	0	53
	10	3.39	325.45	2.44	325.85	1.49	326.15	0.54	326.25	0.0	326.30	10	
	20	3.39	326.55	2.45	326.90	1.49	327.20	0.54	327.30	0.0	327.40	20	
	30	3.40	327.60	2.45	327.95	1.50	328.25	0.55	328.40	0.0	328.45	30	
	40	3.41	328.65	2.45	329.05	1.50	329.35	0.55	329.45	0.0	329.55	40	
	50	3.42	329.75	2.46	330.10	1.51	330.40	0.55	330.55	0.0	330.60	50	
54	0	3.42	330.80	2.47	331.15	1.51	331.45	0.54	331.60	0.0	331.70	0	54
	10	3.43	331.90	2.47	332.25	1.51	332.55	0.54	332.70	0.0	332.75	10	
	20	3.44	332.95	2.48	333.30	1.52	333.60	0.54	333.75	0.0	333.85	20	
	30	3.44	334.05	2.48	334.35	1.52	334.70	0.55	334.85	0.0	334.95	30	
	40	3.45	335.10	2.49	335.45	1.52	335.75	0.55	335.90	0.0	336.00	40	
	50	3.45	336.15	2.49	336.50	1.53	336.80	0.55	336.95	0.0	337.10	50	
55	0	3.46	337.25	2.50	337.60	1.53	337.90	0.57	338.05	0.0	338.15	0	55
	10	3.47	338.30	2.50	338.65	1.54	338.95	0.57	339.10	0.0	339.25	10	
	20	3.48	339.35	2.52	339.75	1.54	340.05	0.57	340.15	0.0	340.35	20	
	30	3.48	340.45	2.51	340.80	1.54	341.10	0.57	341.25	0.0	341.40	30	
	40	3.49	341.55	2.52	341.85	1.55	342.20	0.57	342.30	0.0	342.45	40	
	50	3.50	342.55	2.52	342.95	1.55	343.25	0.58	343.40	0.0	343.55	50	
56	0	3.50	343.65	2.53	344.00	1.55	344.30	0.58	344.45	0.0	344.60	0	56
	10	3.51	344.70	2.53	345.10	1.56	345.40	0.58	345.50	0.0	345.65	10	
	20	3.52	345.75	2.54	346.15	1.56	346.45	0.58	346.60	0.0	346.70	20	
	30	3.52	346.85	2.54	347.20	1.56	347.55	0.58	347.65	0.0	347.80	30	
	40	3.53	347.90	2.55	348.30	1.57	348.60	0.58	348.75	0.0	348.85	40	
	50	3.54	348.95	2.55	349.35	1.57	349.65	0.59	349.80	0.0	349.95	50	
57	0	3.55	350.05	2.56	350.45	1.57	350.75	0.59	350.90	0.0	351.00	0	57
	10	3.55	351.10	2.56	351.50	1.58	351.80	0.59	351.95	0.0	352.05	10	
	20	3.56	352.15	2.57	352.55	1.58	352.85	0.59	353.00	0.0	353.10	20	
	30	3.57	353.25	2.57	353.65	1.58	353.95	0.59	354.10	0.0	354.15	30	
	40	3.57	354.30	2.58	354.70	1.59	355.00	0.59	355.15	0.0	355.25	40	
	50	3.58	355.35	2.58	355.75	1.59	356.05	0.59	356.20	0.0	356.30	50	
58	0	3.59	356.45	2.59	356.85	1.59	357.15	1.0	357.30	0.0	357.35	0	58
	10	3.59	357.50	2.59	357.90	2.0	358.20	1.0	358.35	0.0	358.45	10	
	20	4.0	358.55	3.0	358.95	2.0	359.30	1.0	359.40	0.0	359.50	20	
	30	4.1	359.65	3.1	360.05	2.1	360.35	1.0	360.45	0.0	360.60	30	
	40	4.1	360.70	3.1	361.10	2.1	361.40	1.0	361.55	0.0	361.65	40	
	50	4.2	361.75	3.2	362.15	2.1	362.50	1.0	362.60	0.0	362.70	50	
59	0	4.3	362.85	3.2	363.25	2.2	363.55	1.1	363.70	0.0	363.75	0	59
	10	4.3	363.90	3.3	364.30	2.2	364.65	1.1	364.75	0.0	364.85	10	
	20	4.4	364.95	3.3	365.35	2.2	365.70	1.1	365.85	0.0	365.90	20	
	30	4.5	366.05	3.4	366.45	2.3	366.80	1.1	366.90	0.0	367.00	30	
	40	4.5	367.10	3.4	367.50	2.3	367.85	1.1	368.00	0.0	368.05	40	
	50	4.6	368.15	3.5	368.55	2.3	368.90	1.1	369.05	0.0	369.15	50	
60	0	4.7	369.25	3.5	369.65	2.4	370.00	1.2	370.15	0.0	370.20	0	60
	10	4.7	370.30	3.6	370.70	2.4	371.05	1.2	371.20	0.0	371.30	10	
	20	4.8	371.35	3.6	371.75	2.5	372.10	1.2	372.25	0.0	372.35	20	
	30	4.9	372.45	3.7	372.85	2.5	373.15	1.2	373.35	0.0	373.45	30	
	40	4.9	373.50	3.7	373.90	2.5	374.25	1.2	374.40	0.0	374.50	40	
	50	4.10	374.60	3.8	374.95	2.6	375.30	1.3	375.50	0.0	375.60	50	
61	0	4.11	375.65	3.9	376.05	2.6	376.40	1.3	376.55	0.0	376.65	0	61
	10	4.11	376.75	3.9	377.10	2.6	377.45	1.3	377.60	0.0	377.75	10	
	20	4.12	377.80	3.10	378.20	2.7	378.50	1.3	378.70	0.0	378.80	20	
	30	4.13	378.85	3.10	379.25	2.7	379.60	1.3	379.75	0.0	379.90	30	
	40	4.13	379.95	3.11	380.35	2.7	380.65	1.3	380.85	0.0	380.95	40	
	50	4.14	381.00	3.11	381.40	2.8	381.70	1.4	381.90	0.0	382.05	50	
62	0	4.15	382.10	3.12	382.50	2.8	382.80	1.4	383.00	0.0	383.10	0	62
Moon's Hor. Par.		86°		87°		88°		89°		90°		Moon's Hor. Par.	
M	S	Corr.	Loga- rithms.	M	S	Corr.	Loga- rithms.	M	S	C.	Loga- rithms.	S	M

TABLE III.

Numbers to be added to the *Logarithms*, in Table II. when the Moon's Distance from the Sun is observed.

D	N	D	N	D	N	D	N	D	N	D	N
3	1,40	20	0,35	30	0,50	41	0,65	54	0,75	69	0,90
4	0,95	21	0,40	32	0,50	42	0,65	55	0,80	70	0,90
5	0,70	22	0,40	33	0,55	44	0,65	60	0,80	72	0,90
6	0,55	24	0,40	34	0,55	46	0,70	62	0,80	74	0,90
7	0,45	25	0,40	36	0,55	48	0,70	63	0,85	76	0,90
8	0,40	26	0,45	37	0,60	49	0,70	64	0,85	80	0,90
9	0,35	28	0,45	38	0,60	50	0,75	66	0,85	86	0,90
10	0,35	29	0,50	40	0,60	52	0,75	68	0,85	90	0,90

TABLE IV.

Numbers to be added to the *Logarithms*, in Table II. when the Moon's Distance from a Star is observed.

D	N	D	N	D	N	D	N
3	1,35	7	0,35	11	0,15	15	0,03
4	0,90	8	0,30	12	0,15	20	0,05
5	0,65	9	0,25	13	0,10	25	0,05
6	0,45	10	0,20	14	0,10	26	0,06

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TABLE V.

PROPORTIONAL
LOGARITHMS.

S	h	m	h	m	h	m	h	m	h	m	h	m	h	m	S
°	'	°	'	°	'	°	'	°	'	°	'	°	'	°	'
0		2,2553	1,9542	1,7782	1,6532	1,5563	1,4771	1,4102	1,3522	0					
1	4,0334	2,2481	1,9506	1,7757	1,6514	1,5548	1,4759	1,4091	1,3513	1					
2	3,7324	2,2410	1,9470	1,7738	1,6496	1,5534	1,4747	1,4081	1,3504	2					
3	3,5563	2,2341	1,9435	1,7710	1,6478	1,5530	1,4735	1,4071	1,3495	3					
4	3,4313	2,2272	1,9400	1,7686	1,6460	1,5505	1,4723	1,4060	1,3486	4					
5	3,3344	2,2205	1,9365	1,7662	1,6442	1,5491	1,4711	1,4050	1,3477	5					
6	3,2553	2,2139	1,9331	1,7639	1,6425	1,5477	1,4699	1,4040	1,3468	6					
7	3,1883	2,2073	1,9296	1,7616	1,6407	1,5463	1,4687	1,4030	1,3459	7					
8	3,1303	2,2009	1,9262	1,7592	1,6390	1,5449	1,4676	1,4020	1,3450	8					
9	3,0792	2,1946	1,9228	1,7570	1,6372	1,5435	1,4664	1,4010	1,3441	9					
10	3,0334	2,1883	1,9195	1,7546	1,6355	1,5420	1,4652	1,3999	1,3432	10					
11	2,9900	2,1821	1,9161	1,7524	1,6337	1,5400	1,4640	1,3989	1,3423	11					
12	2,9542	2,1761	1,9128	1,7501	1,6320	1,5393	1,4629	1,3979	1,3413	12					
13	2,9195	2,1701	1,9096	1,7478	1,6303	1,5379	1,4617	1,3969	1,3406	13					
14	2,8873	2,1642	1,9063	1,7456	1,6286	1,5365	1,4605	1,3959	1,3397	14					
15	2,8573	2,1584	1,9031	1,7434	1,6269	1,5351	1,4594	1,3949	1,3388	15					
16	2,8293	2,1526	1,9999	1,7411	1,6252	1,5337	1,4582	1,3939	1,3379	16					
17	2,8030	2,1469	1,9967	1,7389	1,6235	1,5323	1,4571	1,3929	1,3370	17					
18	2,7782	2,1413	1,9935	1,7368	1,6218	1,5310	1,4559	1,3919	1,3362	18					
19	2,7546	2,1358	1,9904	1,7345	1,6201	1,5296	1,4548	1,3909	1,3353	19					
20	2,7324	2,1303	1,8873	1,7324	1,6184	1,5283	1,4536	1,3899	1,3344	20					
21	2,7112	2,1249	1,8842	1,7302	1,6168	1,5269	1,4525	1,3890	1,3336	21					
22	2,6910	2,1190	1,8811	1,7281	1,6151	1,5255	1,4513	1,3880	1,3327	22					
23	2,6717	2,1143	1,8781	1,7259	1,6134	1,5242	1,4502	1,3872	1,3318	23					
24	2,6533	2,1091	1,8751	1,7238	1,6118	1,5229	1,4491	1,3866	1,3310	24					
25	2,6355	2,1040	1,8720	1,7216	1,6102	1,5215	1,4479	1,3850	1,3301	25					
26	2,6184	2,0989	1,8690	1,7195	1,6085	1,5202	1,4468	1,3841	1,3293	26					
27	2,6021	2,0939	1,8661	1,7175	1,6069	1,5189	1,4457	1,3831	1,3284	27					
28	2,5862	2,0889	1,8631	1,7153	1,6053	1,5175	1,4446	1,3821	1,3275	28					
29	2,5710	2,0840	1,8602	1,7133	1,6037	1,5162	1,4435	1,3811	1,3267	29					
30	2,5563	2,0792	1,8573	1,7112	1,6021	1,5149	1,4424	1,3802	1,3259	30					
31	2,5420	2,0744	1,8544	1,7091	1,6004	1,5136	1,4412	1,3792	1,3250	31					
32	2,5283	2,0696	1,8516	1,7071	1,5988	1,5123	1,4401	1,3783	1,3241	32					
33	2,5149	2,0649	1,8487	1,7050	1,5973	1,5110	1,4390	1,3773	1,3233	33					
34	2,5019	2,0603	1,8459	1,7030	1,5957	1,5097	1,4379	1,3769	1,3224	34					
35	2,4893	2,0557	1,8431	1,7010	1,5941	1,5084	1,4368	1,3754	1,3216	35					
36	2,4771	2,0512	1,8403	1,6990	1,5925	1,5071	1,4357	1,3745	1,3208	36					
37	2,4652	2,0466	1,8375	1,6969	1,5909	1,5058	1,4346	1,3735	1,3199	37					
38	2,4536	2,0422	1,8347	1,6949	1,5894	1,5045	1,4335	1,3725	1,3191	38					
39	2,4424	2,0378	1,8320	1,6930	1,5878	1,5032	1,4325	1,3716	1,3183	39					
40	2,4313	2,0334	1,8293	1,6910	1,5862	1,5019	1,4313	1,3706	1,3174	40					
41	2,4206	2,0291	1,8266	1,6890	1,5847	1,5006	1,4303	1,3697	1,3166	41					
42	2,4102	2,0248	1,8239	1,6871	1,5832	1,4994	1,4292	1,3688	1,3158	42					
43	2,3999	2,0206	1,8213	1,6851	1,5816	1,4981	1,4281	1,3678	1,3149	43					
44	2,3899	2,0164	1,8186	1,6832	1,5801	1,4968	1,4270	1,3669	1,3141	44					
45	2,3802	2,0122	1,8159	1,6812	1,5786	1,4956	1,4260	1,3660	1,3133	45					
46	2,3706	2,0081	1,8133	1,6793	1,5770	1,4943	1,4249	1,3650	1,3124	46					
47	2,3613	2,0040	1,8107	1,6774	1,5755	1,4931	1,4238	1,3641	1,3116	47					
48	2,3522	2,0000	1,8081	1,6755	1,5740	1,4918	1,4228	1,3632	1,3108	48					
49	2,3432	1,9960	1,8055	1,6736	1,5725	1,4906	1,4217	1,3622	1,3099	49					
50	2,3344	1,9920	1,8030	1,6717	1,5710	1,4893	1,4206	1,3613	1,3091	50					
51	2,3259	1,9881	1,8004	1,6698	1,5695	1,4881	1,4196	1,3604	1,3083	51					
52	2,3174	1,9842	1,7979	1,6679	1,5680	1,4869	1,4185	1,3595	1,3075	52					
53	2,3091	1,9803	1,7954	1,6660	1,5668	1,4856	1,4175	1,3585	1,3067	53					
54	2,3010	1,9765	1,7929	1,6642	1,5651	1,4844	1,4165	1,3576	1,3059	54					
55	2,2930	1,9727	1,7904	1,6623	1,5636	1,4832	1,4154	1,3567	1,3050	55					
56	2,2852	1,9689	1,7879	1,6605	1,5621	1,4820	1,4143	1,3558	1,3042	56					
57	2,2775	1,9652	1,7855	1,6587	1,5607	1,4808	1,4133	1,3549	1,3034	57					
58	2,2700	1,9615	1,7830	1,6568	1,5592	1,4795	1,4122	1,3540	1,3026	58					
59	2,2626	1,9579	1,7805	1,6550	1,5577	1,4783	1,4112	1,3531	1,3018	59					
60	2,2553	1,9542	1,7782	1,6532	1,5563	1,4771	1,4102	1,3522	1,3010	60					

S	h	m	h	m	h	m	h	m	h	m	h	m	h	m	h	m	S
0	0°	0'	0°	10'	0°	11'	0°	12'	0°	13'	0°	14'	0°	15'	0°	16'	0
0	1,3010	1,2553	1,2139	1,1761	1,1413	1,1091	1,0792	1,0512	1,0248								0
1	1,3002	1,2545	1,2132	1,1755	1,1408	1,1086	1,0787	1,0507	1,0244								1
2	1,2994	1,2538	1,2125	1,1749	1,1402	1,1081	1,0782	1,0502	1,0240								2
3	1,2986	1,2531	1,2119	1,1743	1,1397	1,1076	1,0777	1,0498	1,0235								3
4	1,2978	1,2524	1,2112	1,1737	1,1391	1,1071	1,0772	1,0493	1,0231								4
5	1,2970	1,2517	1,2106	1,1731	1,1385	1,1066	1,0768	1,0489	1,0227								5
6	1,2962	1,2510	1,2099	1,1725	1,1380	1,1061	1,0763	1,0484	1,0223								6
7	1,2954	1,2502	1,2093	1,1719	1,1374	1,1055	1,0758	1,0480	1,0218								7
8	1,2946	1,2495	1,2086	1,1713	1,1369	1,1050	1,0753	1,0475	1,0214								8
9	1,2939	1,2488	1,2080	1,1707	1,1363	1,1045	1,0749	1,0471	1,0210								9
10	1,2931	1,2481	1,2073	1,1701	1,1358	1,1040	1,0744	1,0466	1,0206								10
11	1,2923	1,2474	1,2067	1,1695	1,1352	1,1033	1,0739	1,0462	1,0201								11
12	1,2915	1,2467	1,2061	1,1689	1,1347	1,1030	1,0734	1,0458	1,0197								12
13	1,2907	1,2459	1,2054	1,1683	1,1341	1,1025	1,0729	1,0453	1,0193								13
14	1,2899	1,2452	1,2047	1,1677	1,1336	1,1020	1,0725	1,0448	1,0189								14
15	1,2891	1,2445	1,2041	1,1671	1,1331	1,1015	1,0720	1,0444	1,0185								15
16	1,2883	1,2438	1,2035	1,1665	1,1325	1,1009	1,0716	1,0440	1,0180								16
17	1,2875	1,2431	1,2028	1,1659	1,1309	1,1004	1,0710	1,0435	1,0176								17
18	1,2868	1,2424	1,2022	1,1654	1,1314	1,0999	1,0706	1,0431	1,0172								18
19	1,2860	1,2417	1,2015	1,1648	1,1319	1,0994	1,0701	1,0426	1,0168								19
20	1,2852	1,2410	1,2009	1,1642	1,1303	1,0989	1,0696	1,0422	1,0164								20
21	1,2845	1,2403	1,2003	1,1636	1,1298	1,0984	1,0692	1,0418	1,0160								21
22	1,2837	1,2396	1,1996	1,1630	1,1292	1,0979	1,0687	1,0413	1,0155								22
23	1,2829	1,2389	1,1990	1,1624	1,1287	1,0974	1,0682	1,0408	1,0151								23
24	1,2821	1,2382	1,1984	1,1619	1,1282	1,0969	1,0678	1,0404	1,0147								24
25	1,2814	1,2375	1,1977	1,1613	1,1276	1,0964	1,0673	1,0400	1,0143								25
26	1,2806	1,2368	1,1971	1,1607	1,1271	1,0959	1,0668	1,0395	1,0139								26
27	1,2798	1,2361	1,1965	1,1601	1,1266	1,0954	1,0663	1,0391	1,0135								27
28	1,2791	1,2355	1,1958	1,1595	1,1260	1,0949	1,0659	1,0386	1,0130								28
29	1,2783	1,2348	1,1952	1,1589	1,1255	1,0944	1,0654	1,0382	1,0126								29
30	1,2775	1,2341	1,1946	1,1584	1,1249	1,0939	1,0649	1,0378	1,0122								30
31	1,2768	1,2334	1,1939	1,1578	1,1244	1,0934	1,0645	1,0373	1,0118								31
32	1,2760	1,2327	1,1933	1,1572	1,1238	1,0929	1,0640	1,0369	1,0114								32
33	1,2753	1,2320	1,1927	1,1566	1,1233	1,0924	1,0635	1,0365	1,0110								33
34	1,2745	1,2313	1,1920	1,1560	1,1228	1,0919	1,0631	1,0360	1,0106								34
35	1,2737	1,2306	1,1914	1,1555	1,1222	1,0914	1,0626	1,0356	1,0102								35
36	1,2730	1,2300	1,1908	1,1549	1,1217	1,0909	1,0621	1,0352	1,0098								36
37	1,2722	1,2293	1,1902	1,1543	1,1212	1,0904	1,0617	1,0347	1,0093								37
38	1,2715	1,2286	1,1895	1,1537	1,1206	1,0899	1,0612	1,0343	1,0089								38
39	1,2707	1,2279	1,1889	1,1532	1,1201	1,0894	1,0608	1,0339	1,0085								39
40	1,2700	1,2272	1,1883	1,1526	1,1196	1,0889	1,0603	1,0334	1,0081								40
41	1,2692	1,2265	1,1877	1,1520	1,1191	1,0884	1,0598	1,0330	1,0077								41
42	1,2685	1,2256	1,1871	1,1515	1,1186	1,0880	1,0594	1,0326	1,0073								42
43	1,2677	1,2252	1,1864	1,1509	1,1180	1,0875	1,0589	1,0321	1,0069								43
44	1,2670	1,2245	1,1858	1,1503	1,1175	1,0870	1,0584	1,0317	1,0065								44
45	1,2663	1,2239	1,1852	1,1498	1,1170	1,0865	1,0580	1,0313	1,0061								45
46	1,2655	1,2232	1,1846	1,1492	1,1164	1,0860	1,0575	1,0308	1,0057								46
47	1,2648	1,2225	1,1840	1,1486	1,1159	1,0855	1,0571	1,0304	1,0053								47
48	1,2640	1,2218	1,1834	1,1481	1,1154	1,0850	1,0566	1,0300	1,0049								48
49	1,2633	1,2212	1,1828	1,1475	1,1148	1,0845	1,0561	1,0295	1,0044								49
50	1,2626	1,2205	1,1822	1,1469	1,1143	1,0840	1,0557	1,0291	1,0040								50
51	1,2618	1,2198	1,1816	1,1464	1,1138	1,0835	1,0552	1,0287	1,0036								51
52	1,2611	1,2192	1,1809	1,1458	1,1133	1,0830	1,0548	1,0283	1,0032								52
53	1,2603	1,2185	1,1803	1,1452	1,1128	1,0826	1,0543	1,0278	1,0028								53
54	1,2596	1,2178	1,1797	1,1447	1,1123	1,0821	1,0539	1,0274	1,0024								54
55	1,2589	1,2172	1,1791	1,1441	1,1117	1,0816	1,0534	1,0269	1,0020								55
56	1,2582	1,2165	1,1785	1,1435	1,1112	1,0811	1,0529	1,0265	1,0016								56
57	1,2574	1,2159	1,1779	1,1430	1,1107	1,0806	1,0525	1,0261	1,0012								57
58	1,2567	1,2152	1,1773	1,1424	1,1102	1,0801	1,0520	1,0257	1,0008								58
59	1,2560	1,2145	1,1767	1,1419	1,1096	1,0796	1,0516	1,0252	1,0004								59
60	1,2553	1,2139	1,1761	1,1413	1,1091	1,0792	1,0512	1,0248	1,0000								60

S	h	m	h	m	h	m	h	m	h	m	h	m	h	m	S
0	18'	19'	20'	21'	22'	23'	24'	25'	26'	27'					0
0	1.0000	9765	9542	9331	9128	8935	8751	8573	8403	8239					1
1	9996	9761	9539	9327	9125	8932	8748	8570	8400	8236					2
2	9992	9757	9535	9323	9122	8929	8745	8567	8397	8234					3
3	9988	9754	9532	9320	9119	8926	8742	8565	8395	8231					4
4	9984	9750	9528	9317	9115	8923	8739	8562	8392	8228					5
5	9980	9746	9524	9313	9112	8920	8736	8559	8389	8225					6
6	9976	9742	9521	9310	9109	8917	8733	8556	8386	8222					7
7	9972	9738	9517	9306	9105	8913	8730	8553	8383	8220					8
8	9968	9735	9513	9303	9102	8910	8727	8550	8381	8217					9
9	9964	9731	9510	9300	9099	8907	8724	8547	8378	8215					10
10	9960	9727	9506	9296	9096	8904	8721	8544	8375	8212					11
11	9956	9723	9503	9293	9092	8901	8718	8541	8372	8209					12
12	9952	9720	9499	9289	9088	8898	8715	8539	8370	8207					13
13	9948	9716	9495	9286	9086	8895	8712	8536	8367	8204					14
14	9944	9712	9492	9282	9082	8891	8709	8533	8364	8202					15
15	9940	9708	9488	9279	9079	8888	8706	8530	8361	8199					16
16	9936	9704	9485	9276	9076	8885	8703	8527	8358	8196					17
17	9932	9701	9481	9272	9073	8882	8700	8524	8356	8194					18
18	9928	9697	9478	9269	9070	8879	8697	8522	8353	8191					19
19	9924	9693	9474	9265	9066	8876	8694	8519	8350	8188					20
20	9920	9689	9470	9262	9063	8873	8691	8516	8347	8186					21
21	9916	9686	9467	9259	9060	8870	8688	8513	8345	8183					22
22	9912	9682	9463	9255	9056	8867	8685	8510	8342	8180					23
23	9908	9678	9460	9252	9053	8864	8682	8507	8339	8178					24
24	9905	9675	9456	9249	9050	8861	8679	8504	8337	8175					25
25	9901	9671	9453	9245	9047	8857	8676	8501	8334	8172					26
26	9897	9667	9449	9242	9044	8854	8673	8498	8331	8170					27
27	9893	9664	9446	9238	9041	8851	8670	8496	8328	8167					28
28	9889	9660	9442	9235	9037	8848	8667	8493	8325	8164					29
29	9885	9656	9439	9231	9034	8845	8664	8490	8323	8162					30
30	9881	9652	9435	9228	9031	8842	8661	8487	8320	8159					31
31	9877	9648	9431	9225	9027	8839	8658	8484	8317	8157					32
32	9873	9645	9428	9221	9024	8836	8655	8481	8315	8154					33
33	9869	9641	9425	9218	9021	8833	8652	8479	8312	8152					34
34	9865	9637	9421	9215	9018	8830	8649	8476	8309	8149					35
35	9861	9634	9417	9211	9015	8827	8646	8473	8306	8146					36
36	9858	9630	9414	9208	9012	8824	8643	8470	8304	8144					37
37	9854	9626	9410	9205	9008	8820	8640	8467	8301	8141					38
38	9850	9623	9407	9201	9005	8817	8637	8464	8298	8138					39
39	9846	9619	9404	9198	9002	8814	8635	8462	8296	8136					40
40	9842	9615	9400	9195	8999	8811	8632	8459	8293	8133					41
41	9838	9612	9396	9191	8995	8808	8629	8456	8290	8130					42
42	9834	9608	9393	9188	8992	8805	8626	8453	8288	8128					43
43	9830	9604	9389	9185	8989	8802	8623	8450	8285	8125					44
44	9826	9601	9386	9181	8986	8799	8620	8448		8122					45
45	9823	9597	9383	9178	8983	8796	8617	8445	79	8120					46
46	9819	9593	9379	9175	8980	8793	8614	8442	8277	8117					47
47	9815	9590	9375	9171	8976	8790	8611	8439	8274	8115					48
48	9811	9586	9372	9168	8973	8787	8608	8437	8271	8112					49
49	9807	9582	9368	9165	8970	8784	8605	8434	8268	8109					50
50	9803	9579	9365	9161	8967	8781	8602	8431	8266	8107					51
51	9800	9575	9362	9158	8964	8778	8599	8428	8263	8104					52
52	9796	9571	9358	9155	8960	8775	8596	8425	8260	8102					53
53	9792	9568	9355	9151	8957	8772	8593	8422	8258	8099					54
54	9788	9564	9351	9148	8954	8769	8591	8420	8255	8097					55
55	9784	9560	9348	9145	8951	8766	8588	8417	8252	8094					56
56	9780	9557	9344	9141	8948	8763	8585	8414	8250	8091					57
57	9777	9553	9341	9138	8945	8760	8582	8411	8247	8089					58
58	9773	9549	9337	9135	8942	8757	8579	8408	8244	8086					59
59	9769	9546	9334	9132	8939	8754	8576	8406	8242	8084					60
60	9765	9542	9331	9128	8935	8751	8573	8403	8239	8081					

s	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	s
0	0°28'	0°29'	0°30'	0°31'	0°32'	0°33'	0°34'	0°35'	0°36'	0°37'	0
1	8078	7926	7779	7637	7499	7365	7236	7112	6990	6871	1
2	8076	7924	7776	7634	7496	7363	7234	7108	6986	6867	2
3	8073	7921	7774	7632	7494	7361	7232	7106	6984	6865	3
4	8071	7919	7772	7630	7492	7359	7229	7104	6982	6863	4
5	8068	7916	7769	7627	7490	7356	7227	7102	6980	6861	5
6	8066	7914	7767	7625	7488	7354	7225	7100	6978	6859	6
7	8063	7911	7764	7623	7485	7352	7223	7097	6976	6857	7
8	8060	7909	7762	7620	7483	7350	7221	7095	6974	6855	8
9	8058	7906	7760	7618	7481	7348	7219	7093	6972	6853	9
10	8055	7904	7757	7616	7478	7345	7216	7091	6970	6851	10
11	8053	7901	7755	7613	7476	7343	7214	7089	6968	6849	11
12	8050	7899	7753	7611	7474	7341	7212	7087	6966	6847	12
13	8047	7896	7750	7609	7472	7339	7210	7085	6964	6845	13
14	8045	7894	7748	7606	7469	7337	7208	7083	6962	6843	14
15	8043	7891	7745	7604	7467	7335	7206	7081	6960	6841	15
16	8040	7889	7743	7602	7465	7332	7204	7079	6958	6839	16
17	8037	7886	7740	7599	7463	7330	7202	7077	6956	6837	17
18	8035	7884	7738	7597	7461	7328	7200	7075	6954	6836	18
19	8032	7881	7736	7595	7458	7326	7197	7073	6952	6834	19
20	8030	7879	7733	7592	7456	7324	7195	7071	6950	6832	20
21	8027	7877	7731	7590	7454	7322	7193	7069	6948	6830	21
22	8024	7874	7729	7588	7452	7319	7191	7067	6946	6828	22
23	8022	7872	7726	7586	7449	7317	7189	7065	6944	6826	23
24	8020	7869	7724	7583	7447	7315	7187	7063	6942	6824	24
25	8017	7867	7721	7581	7445	7313	7185	7061	6940	6822	25
26	8014	7864	7719	7579	7443	7311	7183	7059	6938	6820	26
27	8012	7862	7717	7577	7441	7309	7181	7057	6936	6818	27
28	8009	7859	7714	7574	7438	7306	7179	7054	6934	6816	28
29	8007	7857	7712	7572	7436	7304	7177	7052	6932	6814	29
30	8004	7855	7710	7570	7434	7302	7175	7050	6930	6812	30
31	8002	7853	7707	7567	7431	7300	7172	7048	6928	6810	31
32	7999	7849	7705	7565	7429	7298	7170	7046	6926	6808	32
33	7997	7847	7703	7563	7427	7296	7168	7044	6924	6807	33
34	7994	7844	7700	7560	7425	7293	7166	7042	6922	6805	34
35	7991	7842	7698	7558	7423	7291	7164	7040	6920	6803	35
36	7989	7840	7696	7556	7421	7289	7162	7038	6918	6801	36
37	7986	7837	7693	7553	7418	7287	7160	7036	6916	6799	37
38	7984	7835	7691	7551	7416	7285	7158	7034	6914	6797	38
39	7981	7832	7688	7549	7414	7283	7156	7032	6912	6795	39
40	7979	7830	7686	7546	7411	7281	7153	7030	6910	6793	40
41	7976	7827	7683	7544	7409	7278	7151	7028	6908	6791	41
42	7974	7825	7681	7542	7407	7276	7149	7026	6906	6789	42
43	7971	7823	7679	7540	7405	7274	7147	7024	6904	6787	43
44	7969	7820	7676	7537	7403	7272	7145	7022	6902	6785	44
45	7966	7818	7674	7535	7401	7270	7143	7020	6900	6784	45
46	7964	7815	7672	7533	7398	7268	7141	7018	6898	6782	46
47	7961	7813	7669	7531	7396	7266	7139	7016	6896	6780	47
48	7959	7811	7667	7528	7394	7264	7137	7014	6894	6778	48
49	7956	7808	7665	7526	7392	7262	7135	7012	6892	6776	49
50	7954	7805	7662	7524	7389	7259	7133	7010	6890	6774	50
51	7951	7803	7660	7522	7387	7257	7131	7008	6888	6772	51
52	7949	7801	7658	7519	7385	7255	7128	7006	6886	6770	52
53	7946	7798	7655	7517	7383	7253	7126	7004	6884	6768	53
54	7944	7796	7653	7515	7381	7251	7124	7002	6882	6766	54
55	7941	7793	7651	7512	7378	7248	7122	7000	6880	6764	55
56	7939	7791	7648	7510	7376	7246	7120	6998	6878	6762	56
57	7936	7789	7646	7508	7374	7244	7118	6996	6877	6761	57
58	7934	7786	7644	7506	7372	7242	7116	6994	6875	6759	58
59	7931	7784	7641	7503	7370	7240	7114	6992	6873	6757	59
60	7929	7782	7639	7501	7368	7238	7112	6990	6871	6755	60

S	h m ° 38'	h m ° 39'	h m ° 40'	h m ° 41'	h m ° 42'	h m ° 43'	h m ° 44'	h m ° 45'	h m ° 46'	h m ° 47'	S
0	6755	6642	6532	6425	6320	6218	6118	6021	5923	5822	0
1	6753	6640	6530	6423	6318	6216	6116	6019	5921	5820	1
2	6751	6638	6528	6421	6317	6214	6115	6017	5919	5818	2
3	6749	6637	6527	6420	6315	6213	6113	6016	5918	5817	3
4	6747	6635	6525	6418	6313	6211	6111	6014	5916	5815	4
5	6745	6633	6523	6416	6311	6209	6110	6012	5914	5813	5
6	6743	6631	6521	6414	6310	6208	6108	6011	5913	5812	6
7	6741	6629	6519	6412	6308	6206	6106	6009	5911	5810	7
8	6739	6627	6517	6411	6306	6204	6105	6008	5910	5809	8
9	6738	6625	6516	6409	6305	6203	6103	6006	5908	5807	9
10	6736	6623	6514	6407	6303	6201	6102	6004	5906	5805	10
11	6734	6621	6512	6405	6301	6199	6100	6003	5905	5804	11
12	6732	6620	6510	6404	6300	6198	6099	6001	5903	5802	12
13	6730	6618	6508	6402	6298	6196	6097	6000	5902	5801	13
14	6728	6616	6507	6400	6296	6194	6095	5998	5901	5800	14
15	6726	6614	6505	6398	6294	6193	6094	5997	5900	5800	15
16	6724	6612	6503	6397	6293	6191	6092	5995	5900	5800	16
17	6722	6610	6501	6395	6291	6189	6090	5993	5900	5800	17
18	6721	6609	6500	6393	6289	6188	6089	5992	5900	5800	18
19	6719	6607	6498	6391	6287	6186	6087	5990	5900	5800	19
20	6717	6605	6496	6390	6286	6184	6085	5988	5900	5800	20
21	6715	6603	6494	6388	6284	6183	6084	5987	5900	5800	21
22	6713	6601	6492	6386	6282	6181	6082	5985	5900	5800	22
23	6711	6599	6490	6384	6281	6179	6081	5984	5900	5800	23
24	6709	6598	6489	6383	6279	6178	6079	5983	5900	5800	24
25	6707	6596	6487	6381	6277	6176	6077	5980	5900	5800	25
26	6705	6594	6485	6379	6275	6174	6075	5979	5900	5800	26
27	6704	6592	6484	6377	6274	6173	6074	5977	5900	5800	27
28	6702	6590	6482	6376	6272	6171	6072	5976	5900	5800	28
29	6700	6588	6480	6374	6270	6169	6071	5974	5900	5800	29
30	6698	6587	6478	6372	6269	6168	6069	5973	5900	5800	30
31	6696	6585	6476	6370	6267	6166	6067	5971	5900	5800	31
32	6694	6583	6474	6369	6265	6164	6066	5969	5900	5800	32
33	6692	6581	6473	6367	6264	6163	6064	5968	5900	5800	33
34	6690	6579	6471	6365	6262	6161	6062	5966	5900	5800	34
35	6689	6577	6469	6363	6260	6159	6061	5964	5900	5800	35
36	6687	6576	6467	6362	6259	6158	6059	5963	5900	5800	36
37	6685	6574	6465	6360	6257	6156	6058	5961	5900	5800	37
38	6683	6572	6464	6358	6255	6154	6056	5960	5900	5800	38
39	6681	6570	6462	6357	6254	6153	6055	5958	5900	5800	39
40	6679	6568	6460	6355	6252	6151	6053	5957	5900	5800	40
41	6677	6566	6458	6353	6250	6149	6051	5955	5900	5800	41
42	6676	6565	6457	6351	6248	6148	6050	5954	5900	5800	42
43	6674	6563	6455	6349	6247	6146	6048	5952	5900	5800	43
44	6672	6561	6453	6348	6245	6144	6046	5950	5900	5800	44
45	6670	6559	6451	6346	6243	6143	6045	5949	5900	5800	45
46	6668	6557	6449	6344	6241	6141	6043	5947	5900	5800	46
47	6666	6556	6448	6342	6240	6139	6041	5945	5900	5800	47
48	6664	6554	6446	6341	6238	6138	6040	5944	5900	5800	48
49	6662	6552	6444	6339	6236	6136	6038	5942	5900	5800	49
50	6660	6550	6442	6337	6235	6134	6037	5941	5900	5800	50
51	6659	6548	6441	6336	6233	6133	6035	5939	5900	5800	51
52	6657	6546	6439	6334	6231	6131	6033	5938	5900	5800	52
53	6655	6545	6437	6332	6229	6129	6032	5936	5900	5800	53
54	6653	6543	6435	6331	6228	6128	6030	5935	5900	5800	54
55	6651	6541	6434	6329	6226	6126	6028	5933	5900	5800	55
56	6649	6539	6432	6327	6225	6125	6027	5931	5900	5800	56
57	6648	6538	6430	6325	6223	6123	6025	5930	5900	5800	57
58	6646	6536	6428	6323	6221	6121	6024	5928	5900	5800	58
59	6644	6534	6426	6321	6220	6120	6022	5927	5900	5800	59
60	6642	6532	6425	6320	6218	6118	6021	5925	5900	5800	60

S	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	S
	0°48'	0°49'	0°50'	0°51'	0°52'	0°53'	0°54'	0°55'	0°56'	0°57'	
0	5740	5651	5563	5477	5393	5310	5229	5149	5071	4994	0
1	5739	5649	5561	5475	5391	5308	5227	5148	5069	4992	1
2	5737	5648	5560	5474	5390	5307	5226	5146	5068	4991	2
3	5736	5646	5559	5473	5389	5306	5225	5145	5067	4990	3
4	5734	5645	5557	5471	5387	5304	5223	5144	5065	4989	4
5	5733	5643	5556	5470	5386	5303	5222	5143	5064	4987	5
6	5731	5642	5554	5469	5384	5302	5221	5141	5063	4986	6
7	5730	5640	5553	5467	5383	5300	5219	5140	5062	4985	7
8	5728	5639	5551	5465	5381	5299	5218	5138	5060	4984	8
9	5727	5637	5550	5464	5380	5298	5217	5137	5059	4983	9
10	5725	5636	5548	5463	5379	5296	5215	5136	5058	4981	10
11	5724	5634	5547	5461	5377	5295	5214	5134	5056	4980	11
12	5722	5633	5546	5460	5376	5294	5213	5133	5055	4979	12
13	5721	5631	5544	5458	5374	5292	5211	5131	5054	4977	13
14	5719	5630	5543	5457	5373	5291	5210	5130	5053	4976	14
15	5718	5629	5541	5456	5372	5290	5209	5129	5051	4975	15
16	5716	5627	5540	5454	5370	5288	5207	5128	5050	4973	16
17	5715	5626	5538	5453	5369	5287	5206	5127	5049	4972	17
18	5713	5624	5537	5452	5368	5285	5205	5125	5048	4971	18
19	5712	5623	5535	5450	5366	5284	5203	5124	5046	4970	19
20	5710	5621	5534	5449	5365	5283	5202	5123	5045	4968	20
21	5709	5620	5533	5447	5364	5281	5201	5122	5044	4967	21
22	5707	5618	5531	5446	5362	5280	5199	5120	5042	4966	22
23	5706	5617	5530	5444	5361	5278	5198	5119	5041	4965	23
24	5704	5615	5528	5443	5359	5277	5197	5118	5040	4964	24
25	5703	5614	5527	5441	5358	5276	5195	5116	5038	4962	25
26	5701	5612	5525	5440	5356	5274	5194	5115	5037	4961	26
27	5700	5611	5524	5439	5355	5273	5193	5114	5036	4960	27
28	5698	5609	5522	5437	5354	5272	5191	5112	5035	4958	28
29	5697	5608	5521	5436	5352	5270	5190	5111	5033	4957	29
30	5695	5607	5520	5435	5351	5269	5189	5110	5032	4956	30
31	5694	5605	5518	5433	5350	5268	5187	5108	5031	4955	31
32	5693	5604	5517	5432	5348	5266	5186	5107	5030	4953	32
33	5691	5602	5516	5430	5347	5265	5185	5106	5028	4952	33
34	5689	5601	5514	5429	5345	5264	5183	5104	5027	4951	34
35	5688	5599	5512	5427	5344	5262	5182	5103	5026	4950	35
36	5686	5598	5511	5426	5343	5261	5181	5102	5025	4949	36
37	5685	5596	5510	5425	5341	5260	5179	5100	5023	4947	37
38	5683	5595	5508	5423	5340	5258	5178	5099	5022	4946	38
39	5682	5594	5507	5422	5339	5257	5177	5098	5021	4945	39
40	5680	5592	5505	5420	5337	5255	5175	5097	5019	4943	40
41	5679	5590	5504	5419	5336	5254	5174	5095	5018	4942	41
42	5677	5589	5503	5418	5335	5253	5173	5094	5017	4941	42
43	5676	5587	5501	5416	5333	5251	5172	5093	5015	4940	43
44	5674	5586	5500	5415	5332	5250	5170	5091	5013	4938	44
45	5673	5585	5498	5414	5331	5249	5169	5090	5012	4937	45
46	5671	5583	5497	5412	5329	5247	5167	5088	5011	4936	46
47	5670	5582	5495	5411	5328	5246	5166	5087	5010	4934	47
48	5669	5580	5494	5409	5326	5245	5165	5086	5009	4933	48
49	5667	5579	5492	5408	5325	5243	5163	5085	5008	4932	49
50	5665	5577	5491	5406	5323	5242	5162	5084	5006	4931	50
51	5664	5576	5490	5405	5322	5241	5161	5083	5005	4930	51
52	5662	5574	5488	5404	5321	5239	5159	5081	5004	4928	52
53	5661	5573	5487	5403	5319	5238	5158	5080	5003	4927	53
54	5660	5572	5486	5401	5318	5237	5157	5079	5002	4926	54
55	5658	5570	5484	5399	5317	5235	5155	5077	5000	4924	55
56	5656	5569	5482	5398	5315	5234	5154	5076	4999	4923	56
57	5655	5567	5481	5397	5314	5233	5153	5075	4998	4922	57
58	5654	5566	5480	5395	5312	5231	5152	5073	4996	4921	58
59	5652	5564	5478	5394	5311	5230	5150	5072	4995	4919	59
60	5651	5563	5477	5393	5310	5229	5149	5071	4994	4918	60

S	h m 0° 58'	h m 0° 59'	h m 1° 0'	h m 1° 1'	h m 1° 2'	h m 1° 3'	h m 1° 4'	h m 1° 5'	h m 1° 6'	h m 1° 7'	S
0	4918	4844	4771	4699	4629	4559	4491	4424	4357	4292	0
1	4917	4843	4770	4698	4627	4558	4490	4422	4356	4291	1
2	4916	4842	4769	4697	4626	4557	4489	4421	4355	4290	2
3	4915	4841	4768	4696	4625	4556	4488	4420	4354	4289	3
4	4913	4839	4766	4694	4623	4555	4486	4419	4353	4287	4
5	4912	4838	4765	4693	4622	4553	4485	4418	4352	4286	5
6	4911	4837	4764	4692	4622	4552	4484	4417	4351	4285	6
7	4910	4835	4763	4691	4620	4551	4483	4416	4349	4284	7
8	4908	4834	4761	4690	4619	4550	4482	4415	4348	4283	8
9	4907	4833	4760	4689	4618	4549	4481	4414	4347	4282	9
10	4906	4832	4759	4687	4617	4548	4479	4412	4346	4281	10
11	4905	4831	4758	4686	4616	4547	4478	4411	4345	4280	11
12	4903	4830	4757	4685	4615	4546	4477	4410	4344	4279	12
13	4902	4828	4755	4684	4613	4544	4476	4409	4343	4278	13
14	4901	4827	4754	4683	4612	4543	4475	4408	4342	4277	14
15	4900	4826	4753	4682	4611	4542	4474	4407	4341	4276	15
16	4898	4824	4752	4680	4610	4541	4473	4406	4340	4275	16
17	4897	4823	4751	4679	4609	4540	4472	4405	4339	4274	17
18	4896	4822	4750	4678	4608	4539	4471	4404	4338	4273	18
19	4895	4821	4748	4677	4606	4537	4469	4402	4336	4271	19
20	4893	4820	4747	4676	4605	4536	4468	4401	4335	4270	20
21	4892	4819	4746	4675	4604	4535	4467	4400	4334	4269	21
22	4891	4817	4745	4673	4603	4534	4466	4399	4333	4268	22
23	4890	4816	4743	4672	4602	4533	4465	4398	4332	4267	23
24	4889	4815	4742	4671	4601	4532	4464	4397	4331	4266	24
25	4887	4813	4741	4670	4600	4530	4463	4396	4330	4265	25
26	4886	4812	4740	4669	4598	4529	4461	4395	4329	4264	26
27	4885	4811	4739	4668	4597	4528	4460	4394	4328	4263	27
28	4883	4810	4737	4666	4596	4527	4459	4392	4327	4262	28
29	4882	4809	4736	4665	4595	4526	4458	4391	4326	4261	29
30	4881	4808	4735	4664	4594	4525	4457	4390	4325	4260	30
31	4880	4806	4734	4663	4593	4524	4456	4389	4324	4258	31
32	4878	4805	4733	4661	4591	4523	4455	4388	4323	4257	32
33	4877	4804	4732	4660	4590	4522	4454	4387	4321	4256	33
34	4876	4803	4730	4659	4589	4520	4452	4386	4320	4255	34
35	4875	4801	4729	4658	4588	4519	4451	4385	4319	4254	35
36	4874	4800	4728	4657	4587	4518	4450	4384	4318	4253	36
37	4872	4799	4727	4656	4586	4517	4449	4382	4317	4252	37
38	4871	4799	4726	4654	4585	4516	4448	4381	4316	4251	38
39	4870	4797	4724	4653	4584	4515	4447	4380	4315	4250	39
40	4869	4795	4723	4652	4582	4513	4446	4379	4313	4249	40
41	4867	4794	4722	4651	4581	4512	4445	4378	4312	4248	41
42	4866	4793	4721	4650	4580	4511	4444	4377	4311	4247	42
43	4865	4792	4719	4648	4579	4510	4442	4376	4310	4246	43
44	4864	4790	4718	4647	4578	4509	4441	4375	4309	4245	44
45	4863	4789	4717	4646	4577	4508	4440	4374	4308	4244	45
46	4861	4788	4716	4645	4575	4507	4439	4372	4307	4243	46
47	4860	4787	4715	4644	4574	4506	4438	4371	4306	4241	47
48	4859	4786	4714	4643	4573	4505	4437	4370	4305	4240	48
49	4858	4784	4712	4641	4572	4503	4436	4369	4304	4239	49
50	4856	4783	4711	4640	4571	4502	4435	4368	4303	4238	50
51	4855	4782	4710	4639	4570	4501	4434	4367	4302	4237	51
52	4854	4781	4709	4638	4568	4500	4432	4366	4300	4236	52
53	4853	4779	4708	4637	4567	4499	4431	4365	4299	4235	53
54	4852	4778	4707	4636	4566	4498	4430	4364	4298	4234	54
55	4850	4777	4705	4634	4565	4496	4429	4363	4297	4233	55
56	4849	4776	4704	4633	4564	4495	4428	4362	4296	4232	56
57	4848	4775	4703	4632	4563	4494	4427	4361	4295	4231	57
58	4846	4773	4702	4631	4561	4493	4426	4359	4294	4230	58
59	4845	4772	4700	4630	4560	4492	4425	4358	4293	4229	59
60	4844	4771	4699	4629	4559	4491	4424	4357	4292	4227	60

S	h m 1° 8'	h m 1° 9'	h m 1° 10'	h m 1° 11'	h m 1° 12'	h m 1° 13'	h m 1° 14'	h m 1° 15'	h m 1° 16'	h m 1° 17'	S
0	4222	4164	4102	4040	3979	3919	3860	3802	3745	3688	0
1	4226	4163	4101	4039	3978	3918	3859	3801	3744	3687	1
2	4225	4162	4100	4038	3977	3917	3858	3800	3743	3686	2
3	4224	4161	4099	4037	3976	3917	3857	3799	3742	3685	3
4	4223	4160	4098	4036	3975	3916	3856	3798	3741	3684	4
5	4222	4159	4097	4035	3974	3915	3855	3797	3740	3683	5
6	4221	4158	4096	4034	3973	3914	3855	3796	3739	3682	6
7	4220	4157	4094	4033	3972	3913	3854	3795	3738	3681	7
8	4219	4156	4093	4032	3971	3912	3853	3794	3737	3680	8
9	4218	4155	4092	4031	3970	3911	3852	3793	3736	3679	9
10	4217	4154	4091	4030	3969	3910	3851	3792	3735	3678	10
11	4216	4153	4090	4029	3968	3909	3850	3791	3734	3677	11
12	4215	4152	4089	4028	3967	3908	3849	3791	3733	3677	12
13	4214	4151	4088	4027	3966	3907	3848	3790	3732	3676	13
14	4213	4150	4087	4026	3965	3906	3847	3789	3731	3675	14
15	4212	4149	4086	4025	3964	3905	3846	3788	3730	3674	15
16	4211	4147	4085	4024	3963	3904	3845	3787	3729	3673	16
17	4210	4146	4084	4023	3962	3903	3844	3786	3728	3672	17
18	4209	4145	4083	4022	3961	3902	3843	3785	3727	3671	18
19	4207	4144	4082	4021	3960	3901	3842	3784	3726	3670	19
20	4206	4143	4081	4020	3959	3900	3841	3783	3725	3669	20
21	4205	4142	4080	4019	3958	3899	3840	3782	3725	3668	21
22	4204	4141	4079	4018	3957	3898	3839	3781	3724	3667	22
23	4203	4140	4078	4017	3956	3897	3838	3780	3723	3666	23
24	4202	4139	4077	4016	3955	3896	3837	3779	3722	3665	24
25	4201	4138	4076	4015	3954	3895	3836	3778	3721	3664	25
26	4200	4137	4075	4014	3953	3894	3835	3777	3720	3663	26
27	4199	4136	4074	4013	3952	3893	3834	3776	3719	3663	27
28	4198	4135	4073	4012	3951	3892	3833	3775	3718	3662	28
29	4197	4134	4072	4011	3950	3891	3832	3774	3717	3661	29
30	4196	4133	4071	4010	3949	3890	3831	3773	3716	3660	30
31	4195	4132	4070	4009	3948	3889	3830	3772	3715	3659	31
32	4194	4131	4069	4008	3947	3888	3829	3771	3714	3658	32
33	4193	4130	4068	4007	3946	3887	3828	3770	3713	3657	33
34	4191	4129	4067	4006	3945	3886	3827	3769	3712	3656	34
35	4190	4128	4066	4005	3944	3885	3826	3768	3711	3655	35
36	4189	4127	4065	4004	3943	3884	3825	3768	3710	3654	36
37	4188	4126	4064	4003	3942	3883	3824	3767	3709	3653	37
38	4187	4125	4063	4002	3941	3882	3823	3766	3708	3652	38
39	4186	4124	4062	4001	3940	3881	3822	3765	3708	3651	39
40	4185	4122	4061	4000	3939	3880	3821	3764	3707	3650	40
41	4184	4121	4060	3999	3938	3879	3820	3763	3706	3649	41
42	4183	4120	4059	3998	3937	3878	3820	3762	3705	3649	42
43	4182	4119	4057	3997	3936	3877	3819	3761	3704	3648	43
44	4181	4118	4056	3996	3935	3876	3818	3760	3703	3647	44
45	4180	4117	4055	3995	3934	3875	3817	3759	3702	3646	45
46	4179	4116	4054	3993	3933	3874	3816	3758	3701	3645	46
47	4178	4115	4053	3992	3932	3873	3815	3757	3700	3644	47
48	4177	4114	4052	3991	3931	3872	3814	3756	3699	3643	48
49	4176	4113	4051	3990	3930	3871	3813	3755	3698	3642	49
50	4175	4112	4050	3989	3929	3870	3812	3754	3697	3641	50
51	4174	4111	4049	3988	3928	3869	3811	3753	3696	3640	51
52	4173	4110	4048	3987	3927	3868	3810	3752	3695	3639	52
53	4172	4109	4047	3986	3926	3867	3809	3751	3694	3638	53
54	4171	4108	4046	3985	3925	3866	3808	3750	3693	3637	54
55	4169	4107	4045	3984	3924	3865	3807	3749	3692	3636	55
56	4168	4106	4044	3983	3923	3864	3806	3748	3691	3635	56
57	4167	4105	4043	3982	3922	3863	3805	3747	3691	3635	57
58	4166	4104	4042	3981	3921	3862	3804	3746	3690	3634	58
59	4165	4103	4041	3980	3920	3861	3803	3745	3689	3633	59
60	4164	4102	4040	3979	3919	3860	3802	3745	3688	3632	60

S	h m 1° 18'	h m 1° 19'	h m 1° 20'	h m 1° 21'	h m 1° 22'	h m 1° 23'	h m 1° 24'	h m 1° 25'	h m 1° 26'	h m 1° 27'	S
0	3638	3676	3522	3468	3414	3360	3310	3259	3208	3158	0
1	3631	3575	3521	3467	3414	3361	3309	3258	3207	3157	1
2	3630	3574	3520	3466	3413	3360	3308	3257	3206	3156	2
3	3629	3574	3519	3465	3412	3359	3307	3256	3205	3155	3
4	3628	3573	3518	3464	3411	3358	3306	3255	3204	3154	4
5	3627	3572	3517	3463	3410	3358	3306	3254	3203	3153	5
6	3626	3571	3516	3463	3409	3357	3305	3253	3203	3153	6
7	3625	3570	3515	3462	3408	3356	3304	3253	3202	3152	7
8	3624	3569	3514	3461	3407	3355	3303	3252	3201	3151	8
9	3623	3568	3514	3460	3407	3354	3302	3251	3200	3150	9
10	3622	3567	3513	3459	3406	3353	3301	3250	3199	3149	10
11	3621	3566	3512	3458	3405	3352	3300	3249	3198	3148	11
12	3620	3565	3511	3457	3404	3351	3300	3248	3198	3148	12
13	3620	3564	3510	3456	3403	3351	3299	3247	3197	3147	13
14	3619	3563	3509	3455	3402	3350	3298	3247	3196	3146	14
15	3618	3562	3508	3454	3401	3349	3297	3246	3195	3145	15
16	3617	3562	3507	3454	3400	3348	3296	3245	3194	3144	16
17	3616	3561	3506	3453	3400	3347	3296	3244	3193	3143	17
18	3615	3560	3506	3452	3399	3346	3294	3243	3193	3143	18
19	3614	3559	3505	3451	3398	3345	3294	3242	3192	3142	19
20	3613	3558	3504	3450	3397	3344	3293	3241	3191	3141	20
21	3612	3557	3503	3449	3396	3344	3292	3241	3190	3140	21
22	3611	3556	3502	3448	3395	3343	3291	3240	3189	3139	22
23	3610	3555	3501	3447	3394	3342	3290	3239	3188	3138	23
24	3610	3555	3500	3446	3393	3341	3289	3238	3188	3138	24
25	3609	3554	3499	3445	3393	3340	3288	3237	3187	3137	25
26	3608	3553	3498	3445	3392	3339	3287	3236	3186	3136	26
27	3607	3552	3497	3444	3391	3338	3287	3236	3185	3135	27
28	3606	3551	3496	3443	3390	3338	3286	3235	3184	3134	28
29	3605	3550	3496	3442	3389	3337	3285	3234	3183	3133	29
30	3604	3549	3495	3441	3388	3336	3284	3233	3183	3133	30
31	3603	3548	3494	3440	3387	3335	3283	3232	3182	3132	31
32	3602	3547	3493	3439	3386	3334	3282	3231	3181	3131	32
33	3601	3546	3492	3438	3386	3333	3282	3231	3180	3130	33
34	3600	3545	3491	3438	3385	3332	3281	3230	3179	3129	34
35	3599	3544	3490	3437	3384	3331	3280	3229	3178	3128	35
36	3598	3544	3489	3436	3383	3331	3279	3228	3178	3128	36
37	3597	3543	3488	3435	3382	3330	3278	3227	3177	3127	37
38	3596	3542	3487	3434	3381	3329	3277	3226	3176	3126	38
39	3595	3541	3487	3433	3380	3328	3276	3225	3175	3125	39
40	3595	3540	3486	3432	3379	3327	3276	3225	3174	3124	40
41	3594	3539	3485	3431	3378	3326	3275	3224	3173	3123	41
42	3593	3538	3484	3431	3378	3325	3274	3223	3173	3123	42
43	3592	3537	3483	3430	3377	3325	3273	3222	3172	3122	43
44	3591	3536	3482	3429	3376	3324	3272	3221	3171	3121	44
45	3590	3535	3481	3428	3375	3323	3271	3220	3160	3120	45
46	3589	3534	3480	3427	3374	3322	3270	3219	3169	3119	46
47	3588	3533	3479	3426	3373	3321	3270	3219	3168	3119	47
48	3587	3533	3479	3425	3372	3320	3269	3218	3168	3118	48
49	3586	3532	3478	3424	3371	3319	3268	3217	3167	3117	49
50	3585	3531	3477	3423	3371	3318	3267	3216	3166	3116	50
51	3585	3530	3476	3423	3370	3318	3266	3215	3165	3115	51
52	3584	3529	3475	3422	3369	3317	3265	3214	3164	3114	52
53	3583	3528	3474	3421	3368	3316	3264	3214	3163	3114	53
54	3582	3527	3473	3420	3367	3315	3264	3213	3163	3113	54
55	3581	3526	3472	3419	3366	3314	3263	3212	3162	3112	55
56	3580	3525	3471	3418	3365	3313	3262	3211	3161	3111	56
57	3579	3524	3471	3417	3365	3313	3261	3210	3160	3110	57
58	3578	3524	3470	3416	3364	3312	3260	3209	3159	3109	58
59	3577	3523	3469	3415	3363	3311	3259	3209	3158	3109	59
60	3576	3522	3468	3415	3362	3310	3259	3208	3158	3108	60

s	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	s
0	108	3059	3010	2962	2915	2868	2821	2775	2730	2685	0
1	107	3058	3009	2961	2914	2867	2821	2775	2730	2685	1
2	106	3057	3008	2960	2913	2866	2820	2774	2728	2683	2
3	105	3056	3008	2960	2912	2866	2819	2773	2728	2683	3
4	105	3056	3007	2959	2912	2865	2818	2772	2727	2682	4
5	104	3055	3006	2958	2911	2864	2818	2772	2726	2681	5
6	103	3054	3005	2958	2910	2863	2817	2771	2725	2681	6
7	103	3053	3005	2957	2909	2862	2817	2770	2725	2680	7
8	101	3052	3004	2956	2908	2862	2815	2769	2724	2679	8
9	101	3052	3003	2955	2908	2861	2815	2769	2723	2678	9
10	100	3051	3002	2954	2907	2860	2814	2768	2722	2678	10
11	3099	3050	3001	2954	2906	2859	2813	2767	2722	2677	11
12	3098	3049	3001	2953	2905	2859	2812	2766	2721	2676	12
13	3097	3048	3000	2952	2905	2858	2811	2766	2720	2675	13
14	3096	3047	2999	2951	2904	2857	2811	2765	2719	2675	14
15	3096	3047	2998	2950	2903	2856	2810	2764	2718	2674	15
16	3095	3046	2997	2950	2902	2855	2809	2763	2718	2673	16
17	3094	3045	2997	2949	2901	2855	2808	2762	2717	2672	17
18	3093	3044	2996	2948	2901	2854	2808	2762	2716	2672	18
19	3092	3043	2995	2947	2900	2853	2807	2761	2716	2671	19
20	3091	3043	2994	2946	2899	2852	2806	2760	2715	2670	20
21	3091	3042	2993	2946	2898	2852	2805	2760	2714	2669	21
22	3090	3041	2993	2945	2898	2851	2804	2759	2713	2669	22
23	3089	3040	2992	2944	2897	2850	2804	2758	2713	2668	23
24	3088	3039	2991	2943	2896	2849	2803	2757	2712	2667	24
25	3087	3038	2990	2942	2895	2848	2802	2756	2711	2666	25
26	3086	3038	2989	2942	2894	2848	2801	2756	2710	2666	26
27	3086	3037	2989	2941	2894	2847	2801	2755	2710	2665	27
28	3085	3036	2988	2940	2893	2846	2800	2754	2709	2664	28
29	3084	3035	2987	2939	2892	2845	2799	2753	2708	2663	29
30	3083	3034	2986	2939	2891	2845	2798	2752	2707	2663	30
31	3082	3034	2985	2938	2890	2844	2798	2752	2707	2662	31
32	3082	3033	2985	2937	2890	2843	2797	2751	2706	2661	32
33	3081	3032	2984	2936	2889	2842	2796	2750	2705	2660	33
34	3080	3031	2983	2935	2888	2841	2795	2750	2704	2660	34
35	3079	3030	2982	2934	2887	2841	2795	2749	2704	2659	35
36	3078	3030	2981	2934	2887	2840	2794	2748	2703	2658	36
37	3078	3029	2981	2933	2886	2839	2793	2747	2702	2657	37
38	3077	3028	2980	2932	2885	2838	2792	2747	2701	2657	38
39	3076	3027	2979	2931	2884	2838	2792	2746	2701	2656	39
40	3075	3026	2978	2931	2883	2837	2791	2745	2700	2656	40
41	3074	3026	2977	2930	2883	2836	2790	2744	2699	2654	41
42	3073	3025	2977	2929	2882	2835	2789	2744	2698	2654	42
43	3073	3024	2976	2928	2881	2834	2788	2743	2698	2653	43
44	3072	3023	2975	2927	2880	2834	2788	2742	2697	2652	44
45	3071	3022	2974	2927	2880	2833	2787	2741	2696	2652	45
46	3070	3022	2973	2926	2879	2832	2786	2741	2695	2651	46
47	3069	3021	2973	2925	2878	2831	2785	2740	2695	2650	47
48	3069	3020	2972	2924	2877	2831	2785	2739	2694	2649	48
49	3068	3019	2971	2923	2876	2830	2784	2738	2693	2649	49
50	3067	3018	2970	2923	2875	2829	2783	2737	2692	2648	50
51	3066	3018	2969	2922	2875	2828	2782	2737	2692	2647	51
52	3065	3017	2969	2921	2874	2828	2782	2736	2691	2646	52
53	3064	3016	2968	2920	2873	2827	2781	2736	2690	2646	53
54	3064	3015	2967	2920	2873	2826	2780	2735	2689	2645	54
55	3063	3014	2966	2919	2872	2825	2779	2734	2689	2644	55
56	3062	3013	2965	2918	2871	2824	2778	2733	2688	2643	56
57	3061	3013	2965	2917	2870	2824	2778	2732	2687	2643	57
58	3060	3012	2964	2916	2870	2823	2777	2731	2686	2642	58
59	3060	3011	2963	2916	2869	2822	2776	2731	2686	2641	59
60	3059	3010	2962	2915	2868	2821	2775	2730	2685	2640	60

S	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	S
	1°38'	1°39'	1°40'	1°41'	1°42'	1°43'	1°44'	1°45'	1°46'	1°47'	1°48'	
0	2640	2596	2553	2510	2467	2424	2381	2338	2295	2252	2209	0
1	2640	2596	2553	2510	2467	2424	2381	2338	2295	2252	2209	1
2	2639	2595	2551	2508	2465	2422	2379	2336	2293	2250	2207	2
3	2638	2594	2551	2507	2465	2422	2379	2336	2293	2250	2207	3
4	2637	2593	2550	2507	2464	2421	2378	2335	2292	2249	2206	4
5	2637	2593	2549	2506	2463	2421	2379	2337	2296	2255	2214	5
6	2636	2592	2548	2505	2462	2420	2378	2337	2296	2255	2214	6
7	2635	2591	2548	2504	2462	2419	2378	2336	2295	2254	2213	7
8	2634	2590	2547	2504	2461	2419	2377	2385	2294	2253	2212	8
9	2634	2590	2546	2503	2460	2418	2376	2385	2294	2253	2212	9
10	2633	2589	2545	2502	2460	2417	2375	2384	2293	2252	2211	10
11	2633	2588	2545	2502	2459	2417	2375	2383	2292	2251	2210	11
12	2632	2588	2544	2501	2458	2416	2374	2383	2291	2250	2209	12
13	2631	2587	2543	2500	2457	2415	2373	2381	2291	2250	2209	13
14	2630	2586	2543	2499	2457	2414	2373	2381	2290	2249	2208	14
15	2629	2585	2542	2499	2456	2414	2372	2381	2289	2248	2207	15
16	2629	2585	2541	2498	2455	2413	2371	2380	2288	2247	2206	16
17	2628	2584	2540	2497	2455	2412	2371	2379	2287	2246	2205	17
18	2627	2583	2540	2497	2454	2412	2370	2378	2287	2245	2204	18
19	2626	2582	2539	2496	2453	2411	2369	2378	2287	2245	2203	19
20	2626	2582	2538	2495	2452	2410	2368	2377	2286	2244	2202	20
21	2625	2581	2538	2494	2452	2410	2368	2376	2285	2243	2201	21
22	2624	2580	2537	2494	2451	2409	2367	2375	2284	2242	2200	22
23	2623	2580	2536	2493	2450	2408	2366	2374	2283	2241	2199	23
24	2623	2579	2535	2492	2450	2408	2366	2373	2282	2240	2198	24
25	2622	2578	2535	2492	2449	2407	2365	2372	2281	2239	2197	25
26	2621	2577	2534	2491	2448	2406	2364	2371	2280	2238	2196	26
27	2621	2577	2533	2490	2448	2405	2364	2370	2279	2237	2195	27
28	2620	2576	2532	2489	2447	2405	2363	2369	2278	2236	2194	28
29	2619	2575	2532	2489	2446	2404	2362	2368	2277	2235	2193	29
30	2618	2574	2531	2488	2445	2403	2362	2367	2276	2234	2192	30
31	2618	2574	2530	2487	2445	2403	2361	2366	2275	2233	2191	31
32	2617	2573	2530	2487	2444	2402	2360	2365	2274	2232	2190	32
33	2616	2572	2529	2486	2443	2401	2359	2364	2273	2231	2189	33
34	2615	2572	2528	2485	2443	2400	2359	2363	2272	2230	2188	34
35	2615	2571	2527	2484	2442	2400	2358	2362	2271	2229	2187	35
36	2614	2570	2527	2484	2441	2399	2357	2361	2270	2228	2186	36
37	2613	2569	2526	2483	2440	2398	2357	2360	2269	2227	2185	37
38	2612	2569	2525	2482	2440	2398	2356	2359	2268	2226	2184	38
39	2612	2568	2525	2482	2439	2397	2355	2358	2267	2225	2183	39
40	2611	2567	2524	2481	2438	2396	2355	2357	2266	2224	2182	40
41	2610	2566	2523	2480	2438	2396	2354	2356	2265	2223	2181	41
42	2610	2566	2522	2480	2437	2395	2353	2355	2264	2222	2180	42
43	2609	2565	2522	2479	2436	2394	2353	2354	2263	2221	2179	43
44	2608	2564	2521	2478	2436	2394	2352	2353	2262	2220	2178	44
45	2607	2564	2520	2477	2435	2393	2351	2352	2261	2219	2177	45
46	2607	2563	2520	2477	2434	2392	2350	2351	2260	2218	2176	46
47	2606	2562	2519	2476	2433	2391	2350	2350	2259	2217	2175	47
48	2605	2561	2518	2475	2433	2391	2349	2349	2258	2216	2174	48
49	2604	2561	2517	2474	2432	2390	2348	2348	2257	2215	2173	49
50	2604	2560	2517	2474	2431	2389	2348	2347	2256	2214	2172	50
51	2603	2559	2516	2473	2431	2389	2347	2346	2255	2213	2171	51
52	2602	2558	2515	2472	2430	2388	2346	2345	2254	2212	2170	52
53	2601	2558	2514	2471	2429	2387	2345	2344	2253	2211	2169	53
54	2601	2557	2514	2471	2429	2387	2344	2343	2252	2210	2168	54
55	2600	2556	2513	2470	2428	2386	2344	2343	2251	2209	2167	55
56	2599	2556	2512	2470	2427	2385	2343	2342	2250	2208	2166	56
57	2599	2555	2512	2469	2426	2384	2342	2341	2249	2207	2165	57
58	2598	2554	2511	2468	2426	2384	2341	2340	2248	2206	2164	58
59	2597	2553	2510	2467	2425	2383	2341	2340	2247	2205	2163	59
60	2596	2553	2510	2467	2424	2382	2341	2340	2246	2204	2162	60

S	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	S
0	1°48'	1°49'	1°50'	1°51'	1°52'	1°53'	1°54'	1°55'	1°56'	1°57'	0
1	2218	2178	2138	2099	2061	2022	1984	1946	1908	1871	1
2	2218	2178	2138	2099	2060	2021	1983	1945	1907	1870	2
3	2217	2177	2137	2098	2059	2021	1982	1944	1907	1870	3
4	2216	2176	2137	2098	2059	2020	1982	1944	1906	1869	4
5	2216	2176	2136	2097	2058	2019	1981	1943	1906	1868	5
6	2215	2175	2135	2096	2057	2019	1980	1943	1905	1868	6
7	2214	2174	2135	2096	2057	2018	1980	1942	1904	1867	7
8	2214	2174	2134	2095	2056	2017	1979	1941	1904	1867	8
9	2213	2173	2133	2094	2055	2017	1979	1941	1903	1866	9
10	2212	2172	2133	2094	2055	2016	1978	1940	1903	1865	10
11	2212	2172	2132	2093	2054	2016	1977	1939	1902	1865	11
12	2211	2171	2132	2092	2053	2015	1977	1939	1901	1864	12
13	2210	2170	2131	2092	2053	2014	1976	1938	1901	1863	13
14	2210	2170	2130	2091	2052	2014	1975	1938	1900	1863	14
15	2209	2169	2130	2090	2051	2013	1975	1937	1899	1862	15
16	2208	2168	2129	2090	2051	2012	1974	1936	1899	1862	16
17	2208	2168	2128	2089	2050	2012	1973	1936	1898	1861	17
18	2207	2167	2128	2088	2050	2011	1973	1935	1898	1860	18
19	2206	2167	2127	2088	2049	2010	1972	1934	1897	1860	19
20	2206	2166	2126	2087	2048	2010	1972	1934	1896	1859	20
21	2205	2165	2126	2086	2048	2009	1971	1933	1896	1858	21
22	2204	2165	2125	2086	2047	2009	1970	1933	1895	1858	22
23	2204	2164	2124	2085	2046	2008	1970	1932	1894	1857	23
24	2203	2163	2124	2084	2046	2007	1969	1931	1894	1857	24
25	2202	2163	2123	2084	2045	2007	1968	1931	1893	1856	25
26	2202	2162	2122	2083	2044	2006	1968	1930	1893	1855	26
27	2201	2161	2122	2083	2044	2005	1967	1929	1892	1855	27
28	2200	2161	2121	2082	2043	2005	1967	1929	1891	1854	28
29	2200	2160	2120	2081	2042	2004	1966	1928	1891	1854	29
30	2199	2159	2120	2081	2042	2004	1965	1927	1890	1853	30
31	2198	2159	2119	2080	2041	2003	1965	1927	1889	1852	31
32	2198	2158	2118	2079	2041	2002	1964	1926	1889	1852	32
33	2197	2157	2118	2079	2040	2001	1963	1926	1888	1851	33
34	2196	2157	2117	2078	2039	2001	1963	1925	1888	1850	34
35	2196	2156	2116	2077	2039	2000	1962	1924	1887	1850	35
36	2195	2155	2116	2077	2038	2000	1961	1924	1885	1849	36
37	2194	2155	2115	2076	2037	1999	1961	1923	1886	1849	37
38	2194	2154	2114	2075	2037	1998	1960	1922	1885	1848	38
39	2193	2153	2114	2075	2036	1998	1960	1922	1884	1847	39
40	2192	2152	2113	2074	2035	1997	1959	1921	1884	1847	40
41	2191	2152	2113	2073	2035	1996	1958	1921	1883	1846	41
42	2191	2151	2112	2073	2034	1996	1958	1920	1883	1846	42
43	2190	2151	2111	2072	2033	1995	1957	1919	1882	1845	43
44	2190	2150	2111	2071	2033	1994	1956	1919	1881	1844	44
45	2189	2149	2110	2071	2032	1994	1956	1918	1881	1844	45
46	2188	2149	2109	2070	2032	1993	1955	1918	1880	1843	46
47	2188	2148	2109	2070	2031	1993	1955	1917	1879	1842	47
48	2187	2147	2108	2069	2030	1992	1954	1916	1879	1842	48
49	2186	2147	2107	2068	2030	1991	1953	1916	1878	1841	49
50	2186	2146	2107	2068	2029	1991	1953	1915	1878	1841	50
51	2185	2145	2106	2067	2028	1990	1952	1914	1877	1840	51
52	2184	2145	2105	2066	2028	1989	1951	1914	1876	1839	52
53	2184	2144	2105	2066	2027	1989	1951	1913	1876	1839	53
54	2183	2143	2104	2065	2026	1988	1950	1912	1875	1838	54
55	2183	2143	2103	2064	2026	1987	1950	1912	1874	1838	55
56	2182	2142	2103	2064	2025	1987	1949	1911	1874	1837	56
57	2181	2141	2102	2063	2024	1986	1948	1911	1873	1836	57
58	2180	2141	2101	2062	2024	1986	1948	1910	1873	1836	58
59	2179	2140	2101	2062	2023	1985	1947	1909	1872	1835	59
60	2179	2139	2100	2061	2023	1984	1946	1909	1871	1834	60

[illegible]

S	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	S
0	2° 8'	2° 9'	2° 10'	2° 11'	2° 12'	2° 13'	2° 14'	2° 15'	2° 16'	2° 17'	0
0	1481	1447	1413	1380	1347	1314	1282	1249	1217	1186	1
1	1480	1446	1412	1379	1346	1313	1281	1249	1217	1185	2
2	1479	1445	1411	1378	1345	1312	1280	1248	1216	1184	3
3	1478	1444	1410	1377	1344	1311	1279	1247	1215	1183	4
4	1477	1443	1409	1376	1343	1310	1278	1246	1214	1182	5
5	1476	1442	1408	1375	1342	1309	1277	1245	1213	1181	6
6	1475	1441	1407	1374	1341	1308	1276	1244	1212	1180	7
7	1474	1440	1406	1373	1340	1307	1275	1243	1211	1179	8
8	1473	1439	1405	1372	1339	1306	1274	1242	1210	1178	9
9	1472	1438	1404	1371	1338	1305	1273	1241	1209	1177	10
10	1471	1437	1403	1370	1337	1304	1272	1240	1208	1176	11
11	1470	1436	1402	1369	1336	1303	1271	1239	1207	1175	12
12	1469	1435	1401	1368	1335	1302	1270	1238	1206	1174	13
13	1468	1434	1400	1367	1334	1301	1269	1237	1205	1173	14
14	1467	1433	1399	1366	1333	1300	1268	1236	1204	1172	15
15	1466	1432	1398	1365	1332	1299	1267	1235	1203	1171	16
16	1465	1431	1397	1364	1331	1298	1266	1234	1202	1170	17
17	1464	1430	1396	1363	1330	1297	1265	1233	1201	1169	18
18	1463	1429	1395	1362	1329	1296	1264	1232	1200	1168	19
19	1462	1428	1394	1361	1328	1295	1263	1231	1199	1167	20
20	1461	1427	1393	1360	1327	1294	1262	1230	1198	1166	21
21	1460	1426	1392	1359	1326	1293	1261	1229	1197	1165	22
22	1459	1425	1391	1358	1325	1292	1260	1228	1196	1164	23
23	1458	1424	1390	1357	1324	1291	1259	1227	1195	1163	24
24	1457	1423	1389	1356	1323	1290	1258	1226	1194	1162	25
25	1456	1422	1388	1355	1322	1289	1257	1225	1193	1161	26
26	1455	1421	1387	1354	1321	1288	1256	1224	1192	1160	27
27	1454	1420	1386	1353	1320	1287	1255	1223	1191	1159	28
28	1453	1419	1385	1352	1319	1286	1254	1222	1190	1158	29
29	1452	1418	1384	1351	1318	1285	1253	1221	1189	1157	30
30	1451	1417	1383	1350	1317	1284	1252	1220	1188	1156	31
31	1450	1416	1382	1349	1316	1283	1251	1219	1187	1155	32
32	1449	1415	1381	1348	1315	1282	1250	1218	1186	1154	33
33	1448	1414	1380	1347	1314	1281	1249	1217	1185	1153	34
34	1447	1413	1379	1346	1313	1280	1248	1216	1184	1152	35
35	1446	1412	1378	1345	1312	1279	1247	1215	1183	1151	36
36	1445	1411	1377	1344	1311	1278	1246	1214	1182	1150	37
37	1444	1410	1376	1343	1310	1277	1245	1213	1181	1149	38
38	1443	1409	1375	1342	1309	1276	1244	1212	1180	1148	39
39	1442	1408	1374	1341	1308	1275	1243	1211	1179	1147	40
40	1441	1407	1373	1340	1307	1274	1242	1210	1178	1146	41
41	1440	1406	1372	1339	1306	1273	1241	1209	1177	1145	42
42	1439	1405	1371	1338	1305	1272	1240	1208	1176	1144	43
43	1438	1404	1370	1337	1304	1271	1239	1207	1175	1143	44
44	1437	1403	1369	1336	1303	1270	1238	1206	1174	1142	45
45	1436	1402	1368	1335	1302	1269	1237	1205	1173	1141	46
46	1435	1401	1367	1334	1301	1268	1236	1204	1172	1140	47
47	1434	1400	1366	1333	1300	1267	1235	1203	1171	1139	48
48	1433	1399	1365	1332	1299	1266	1234	1202	1170	1138	49
49	1432	1398	1364	1331	1298	1265	1233	1201	1169	1137	50
50	1431	1397	1363	1330	1297	1264	1232	1200	1168	1136	51
51	1430	1396	1362	1329	1296	1263	1231	1199	1167	1135	52
52	1429	1395	1361	1328	1295	1262	1230	1198	1166	1134	53
53	1428	1394	1360	1327	1294	1261	1229	1197	1165	1133	54
54	1427	1393	1359	1326	1293	1260	1228	1196	1164	1132	55
55	1426	1392	1358	1325	1292	1259	1227	1195	1163	1131	56
56	1425	1391	1357	1324	1291	1258	1226	1194	1162	1130	57
57	1424	1390	1356	1323	1290	1257	1225	1193	1161	1129	58
58	1423	1389	1355	1322	1289	1256	1224	1192	1160	1128	59
59	1422	1388	1354	1321	1288	1255	1223	1191	1159	1127	60
60	1421	1387	1353	1320	1287	1254	1222	1190	1158	1126	

s	h m s ^o 18'	h m s ^o 19'	h m s ^o 20'	h m s ^o 21'	h m s ^o 22'	h m s ^o 23'	h m s ^o 24'	h m s ^o 25'	h m s ^o 26'	h m s ^o 27'	s
0	1154	1123	1091	1061	1030	0999	0969	0939	0909	0880	0
1	1153	1122	1091	1060	1029	0999	0969	0939	0909	0879	1
2	1153	1122	1090	1059	1029	0998	0968	0938	0908	0879	2
3	1153	1121	1090	1059	1028	0998	0968	0938	0908	0878	3
4	1153	1120	1089	1058	1028	0997	0967	0937	0907	0878	4
5	1151	1120	1089	1058	1027	0997	0967	0937	0907	0877	5
6	1151	1119	1088	1057	1027	0996	0966	0936	0906	0877	6
7	1150	1119	1088	1057	1026	0996	0966	0936	0906	0876	7
8	1150	1118	1087	1056	1026	0995	0965	0935	0905	0876	8
9	1149	1118	1087	1056	1025	0995	0965	0935	0905	0875	9
10	1149	1117	1086	1055	1025	0994	0964	0934	0904	0875	10
11	1148	1117	1086	1055	1024	0994	0964	0934	0904	0874	11
12	1148	1116	1085	1054	1024	0993	0963	0933	0903	0874	12
13	1147	1116	1085	1054	1023	0993	0963	0933	0903	0873	13
14	1147	1115	1084	1053	1023	0992	0962	0932	0902	0873	14
15	1146	1115	1084	1053	1022	0992	0962	0932	0902	0872	15
16	1146	1114	1083	1052	1022	0991	0961	0931	0901	0872	16
17	1145	1114	1083	1052	1021	0991	0961	0931	0901	0871	17
18	1145	1113	1082	1051	1021	0990	0960	0930	0900	0871	18
19	1144	1113	1082	1051	1020	0990	0960	0930	0900	0870	19
20	1143	1112	1081	1050	1020	0989	0959	0929	0899	0870	20
21	1143	1112	1081	1050	1019	0989	0959	0929	0899	0869	21
22	1142	1111	1080	1049	1019	0988	0958	0928	0898	0869	22
23	1142	1111	1080	1049	1018	0988	0958	0928	0898	0868	23
24	1141	1110	1079	1048	1018	0987	0957	0927	0897	0867	24
25	1141	1110	1079	1048	1017	0987	0957	0927	0897	0867	25
26	1140	1109	1078	1047	1017	0986	0956	0926	0896	0867	26
27	1140	1109	1078	1047	1016	0986	0956	0926	0896	0866	27
28	1139	1108	1077	1046	1016	0985	0955	0925	0895	0866	28
29	1139	1107	1076	1045	1015	0985	0955	0925	0895	0865	29
30	1138	1107	1076	1045	1015	0984	0954	0924	0894	0865	30
31	1138	1106	1075	1045	1014	0984	0954	0924	0894	0864	31
32	1137	1106	1075	1044	1014	0983	0953	0923	0893	0864	32
33	1137	1105	1074	1044	1013	0983	0953	0923	0893	0863	33
34	1136	1105	1074	1043	1013	0982	0952	0922	0892	0863	34
35	1136	1104	1073	1043	1012	0982	0952	0922	0892	0862	35
36	1135	1104	1073	1042	1012	0981	0951	0921	0891	0862	36
37	1135	1103	1072	1042	1011	0981	0951	0921	0891	0861	37
38	1134	1103	1072	1041	1010	0980	0950	0920	0890	0861	38
39	1134	1102	1071	1041	1010	0980	0950	0920	0890	0860	39
40	1133	1102	1071	1040	1009	0979	0949	0919	0889	0860	40
41	1132	1101	1070	1039	1009	0979	0949	0919	0889	0859	41
42	1132	1101	1070	1039	1008	0978	0948	0918	0888	0859	42
43	1131	1100	1069	1038	1008	0978	0948	0918	0888	0858	43
44	1131	1100	1069	1038	1007	0977	0947	0917	0887	0858	44
45	1130	1099	1068	1037	1007	0977	0947	0917	0887	0857	45
46	1130	1099	1068	1037	1006	0976	0946	0916	0886	0857	46
47	1129	1098	1067	1036	1006	0976	0946	0916	0886	0856	47
48	1129	1098	1067	1036	1005	0975	0945	0915	0885	0856	48
49	1128	1097	1066	1035	1005	0975	0945	0915	0885	0855	49
50	1128	1097	1066	1035	1004	0974	0944	0914	0884	0855	50
51	1127	1096	1065	1034	1004	0974	0944	0914	0884	0855	51
52	1127	1096	1065	1034	1003	0973	0943	0913	0883	0854	52
53	1126	1095	1064	1033	1003	0973	0943	0913	0883	0854	53
54	1126	1095	1064	1033	1002	0972	0942	0912	0882	0853	54
55	1125	1094	1063	1032	1002	0972	0942	0912	0882	0853	55
56	1125	1093	1063	1032	1001	0971	0941	0911	0881	0852	56
57	1124	1093	1062	1031	1001	0971	0941	0911	0881	0852	57
58	1124	1092	1062	1031	1000	0970	0940	0910	0880	0851	58
59	1123	1092	1061	1030	1000	0970	0940	0910	0880	0851	59
60	1123	1091	1061	1030	0999	0969	0939	0909	0880	0850	60

s	h m	h m	h m	h m	h m	h m	h m	h m	h m	h m	s
0	0850	0851	0798	0763	0734	0706	0678	0649	0621	0593	0
1	0850	0850	0791	0762	0734	0705	0677	0649	0621	0593	1
2	0850	0850	0791	0762	0733	0705	0677	0648	0621	0592	2
3	0850	0850	0790	0762	0733	0704	0676	0648	0620	0592	3
4	0850	0850	0790	0761	0733	0704	0676	0648	0620	0592	4
5	0850	0850	0789	0761	0733	0703	0675	0647	0619	0591	5
6	0850	0850	0789	0760	0731	0703	0675	0647	0619	0591	6
7	0850	0850	0788	0760	0731	0703	0674	0646	0618	0590	7
8	0850	0850	0788	0759	0730	0702	0674	0646	0618	0590	8
9	0850	0850	0787	0759	0730	0702	0673	0645	0617	0590	9
10	0850	0850	0787	0758	0729	0701	0673	0645	0617	0589	10
11	0850	0850	0787	0758	0729	0701	0672	0644	0616	0589	11
12	0850	0850	0786	0757	0729	0700	0672	0644	0616	0588	12
13	0850	0850	0786	0757	0728	0700	0671	0643	0615	0588	13
14	0850	0850	0785	0756	0728	0699	0671	0643	0615	0587	14
15	0850	0850	0785	0756	0727	0699	0670	0642	0615	0587	15
16	0850	0850	0784	0755	0727	0698	0670	0642	0614	0586	16
17	0850	0850	0784	0755	0726	0698	0669	0641	0614	0586	17
18	0850	0850	0783	0754	0726	0697	0669	0641	0613	0585	18
19	0850	0850	0783	0754	0725	0697	0669	0641	0613	0585	19
20	0850	0850	0782	0753	0725	0696	0668	0640	0612	0584	20
21	0850	0850	0782	0753	0724	0696	0668	0640	0612	0584	21
22	0850	0850	0781	0752	0724	0695	0667	0639	0611	0584	22
23	0850	0850	0781	0752	0723	0695	0667	0639	0611	0583	23
24	0850	0850	0780	0751	0723	0694	0666	0638	0610	0583	24
25	0850	0850	0780	0751	0722	0694	0666	0638	0610	0582	25
26	0850	0850	0779	0750	0722	0693	0665	0637	0609	0582	26
27	0850	0850	0778	0750	0721	0693	0665	0637	0609	0581	27
28	0850	0850	0778	0750	0721	0692	0664	0636	0608	0581	28
29	0850	0850	0777	0749	0720	0692	0664	0636	0608	0580	29
30	0850	0850	0777	0749	0720	0691	0663	0635	0608	0580	30
31	0850	0850	0777	0748	0720	0691	0663	0635	0607	0579	31
32	0850	0850	0776	0748	0719	0691	0662	0634	0607	0579	32
33	0850	0850	0776	0747	0719	0690	0662	0634	0606	0579	33
34	0850	0850	0775	0747	0718	0690	0661	0634	0606	0578	34
35	0850	0850	0775	0746	0718	0689	0661	0633	0605	0578	35
36	0850	0850	0774	0746	0717	0689	0661	0633	0605	0577	36
37	0850	0850	0774	0745	0717	0688	0660	0633	0604	0577	37
38	0850	0850	0773	0745	0716	0688	0660	0632	0604	0576	38
39	0850	0850	0773	0744	0716	0687	0659	0631	0603	0576	39
40	0850	0850	0773	0744	0715	0687	0659	0631	0603	0575	40
41	0850	0850	0772	0743	0715	0686	0658	0630	0602	0575	41
42	0850	0850	0772	0743	0714	0686	0658	0630	0602	0574	42
43	0850	0850	0771	0742	0714	0685	0657	0629	0602	0574	43
44	0850	0850	0771	0742	0713	0685	0657	0629	0601	0573	44
45	0850	0850	0770	0741	0713	0685	0656	0628	0601	0573	45
46	0850	0850	0770	0741	0712	0684	0656	0628	0600	0573	46
47	0850	0850	0769	0740	0712	0684	0655	0627	0600	0572	47
48	0850	0850	0769	0740	0711	0683	0655	0627	0599	0572	48
49	0850	0850	0768	0739	0711	0683	0655	0627	0599	0571	49
50	0850	0850	0768	0739	0711	0682	0654	0626	0598	0571	50
51	0850	0850	0767	0739	0710	0682	0654	0626	0598	0570	51
52	0850	0850	0767	0738	0710	0681	0653	0625	0597	0570	52
53	0850	0850	0766	0738	0709	0681	0653	0625	0597	0569	53
54	0850	0850	0766	0737	0709	0680	0652	0624	0596	0569	54
55	0850	0850	0765	0737	0708	0680	0652	0624	0596	0568	55
56	0850	0850	0765	0736	0708	0679	0651	0623	0596	0568	56
57	0850	0850	0764	0736	0707	0679	0651	0623	0595	0568	57
58	0850	0850	0764	0735	0707	0678	0650	0622	0595	0567	58
59	0850	0850	0763	0735	0706	0678	0650	0622	0594	0567	59
60	0850	0850	0763	0734	0706	0678	0649	0621	0594	0566	60

S	h	m	h	m	h	m	h	m	h	m	h	m	h	m	h	m	h	m	S
	38	39	40	41	42	43	44	45	46	47	48								
0	0566	0539	0513	0484	0458	0431	0404	0378	0352	0326	0300	0							0
1	0566	0538	0511	0484	0457	0430	0404	0377	0351	0325	0299	1							1
2	0565	0538	0510	0484	0457	0430	0403	0377	0351	0325	0299	2							2
3	0565	0537	0510	0483	0456	0430	0403	0377	0350	0324	0298	3							3
4	0564	0537	0510	0483	0456	0429	0402	0376	0350	0324	0298	4							4
5	0564	0536	0509	0482	0455	0429	0402	0376	0349	0323	0297	5							5
6	0563	0536	0509	0482	0455	0428	0401	0375	0349	0323	0297	6							6
7	0563	0536	0508	0481	0454	0428	0401	0375	0349	0322	0297	7							7
8	0562	0535	0508	0481	0454	0427	0400	0374	0348	0322	0296	8							8
9	0562	0535	0507	0480	0454	0427	0400	0374	0348	0322	0296	9							9
10	0562	0534	0507	0480	0453	0426	0400	0373	0347	0321	0295	10							10
11	0561	0534	0507	0479	0453	0426	0399	0373	0347	0321	0295	11							11
12	0561	0533	0506	0479	0452	0426	0399	0373	0346	0320	0294	12							12
13	0560	0533	0506	0479	0452	0425	0399	0372	0346	0320	0294	13							13
14	0560	0532	0505	0478	0451	0425	0398	0372	0345	0319	0294	14							14
15	0559	0532	0505	0478	0451	0424	0398	0371	0345	0319	0293	15							15
16	0559	0531	0504	0477	0450	0424	0397	0371	0344	0318	0293	16							16
17	0558	0531	0504	0477	0450	0423	0397	0370	0344	0318	0292	17							17
18	0558	0531	0503	0476	0450	0423	0396	0370	0344	0318	0292	18							18
19	0557	0530	0503	0476	0449	0422	0396	0370	0343	0317	0291	19							19
20	0557	0530	0502	0475	0449	0422	0395	0369	0343	0317	0291	20							20
21	0557	0529	0502	0475	0448	0422	0395	0369	0342	0316	0291	21							21
22	0556	0529	0502	0475	0448	0421	0395	0368	0342	0316	0290	22							22
23	0556	0528	0501	0474	0447	0421	0394	0368	0341	0315	0290	23							23
24	0555	0528	0501	0474	0447	0420	0394	0367	0341	0315	0289	24							24
25	0555	0527	0500	0473	0446	0420	0393	0367	0341	0315	0289	25							25
26	0554	0527	0500	0473	0446	0419	0393	0366	0340	0314	0288	26							26
27	0554	0526	0499	0472	0446	0419	0392	0366	0340	0314	0288	27							27
28	0553	0526	0499	0472	0445	0418	0392	0365	0339	0313	0288	28							28
29	0553	0526	0498	0471	0445	0418	0391	0365	0339	0313	0287	29							29
30	0552	0525	0498	0471	0444	0418	0391	0365	0339	0313	0287	30							30
31	0552	0525	0497	0471	0444	0417	0391	0364	0338	0312	0286	31							31
32	0551	0524	0497	0470	0443	0417	0390	0364	0338	0312	0286	32							32
33	0551	0524	0497	0470	0443	0416	0390	0363	0337	0311	0285	33							33
34	0551	0523	0496	0469	0442	0416	0389	0363	0337	0311	0285	34							34
35	0550	0523	0496	0469	0442	0415	0389	0363	0336	0310	0285	35							35
36	0550	0522	0495	0468	0442	0415	0388	0362	0336	0310	0284	36							36
37	0549	0522	0495	0468	0441	0414	0388	0362	0336	0310	0284	37							37
38	0549	0521	0494	0467	0441	0414	0387	0362	0335	0309	0283	38							38
39	0548	0521	0494	0467	0440	0414	0387	0361	0335	0309	0283	39							39
40	0548	0520	0493	0466	0440	0413	0387	0360	0334	0308	0283	40							40
41	0547	0520	0493	0466	0439	0413	0386	0360	0334	0308	0282	41							41
42	0547	0520	0493	0466	0439	0412	0386	0359	0333	0307	0282	42							42
43	0546	0519	0492	0465	0438	0412	0385	0359	0333	0307	0281	43							43
44	0546	0519	0492	0465	0438	0411	0385	0359	0332	0306	0281	44							44
45	0546	0518	0491	0464	0438	0411	0384	0358	0332	0306	0280	45							45
46	0545	0518	0491	0464	0437	0410	0384	0358	0332	0306	0280	46							46
47	0545	0517	0490	0463	0437	0410	0384	0357	0331	0305	0279	47							47
48	0544	0517	0490	0463	0436	0410	0383	0357	0331	0305	0279	48							48
49	0544	0516	0489	0462	0436	0409	0383	0356	0330	0304	0279	49							49
50	0543	0516	0489	0462	0435	0409	0382	0356	0330	0304	0278	50							50
51	0543	0516	0489	0462	0435	0408	0382	0356	0330	0304	0278	51							51
52	0542	0515	0488	0461	0434	0408	0381	0355	0329	0303	0277	52							52
53	0542	0515	0488	0461	0434	0407	0381	0355	0329	0303	0277	53							53
54	0541	0514	0487	0460	0434	0407	0381	0354	0328	0303	0276	54							54
55	0541	0514	0487	0460	0433	0406	0380	0354	0328	0302	0276	55							55
56	0541	0513	0486	0459	0433	0406	0380	0353	0327	0301	0276	56							56
57	0540	0513	0486	0459	0432	0406	0379	0353	0327	0301	0275	57							57
58	0540	0512	0485	0458	0432	0405	0379	0352	0326	0300	0275	58							58
59	0539	0512	0485	0458	0431	0405	0378	0352	0326	0300	0274	59							59
60	0539	0511	0484	0458	0431	0404	0378	0352	0326	0300	0274	60							60

s	h	m	h	m	h	m	h	m	h	m	h	m	h	m	h	m	s
0	0	49	0	50	0	51	0	52	0	53	0	54	0	55	0	56	0
0	0274	0243	0223	0197	0172	0147	0122	0098	0073	0049	0024	0	0	0	0	0	0
1	0273	0242	0222	0197	0172	0147	0122	0097	0073	0048	0024	1	1	1	1	1	1
2	0273	0247	0222	0197	0171	0146	0121	0097	0072	0048	0023	2	2	2	2	2	2
3	0273	0247	0221	0196	0171	0146	0121	0096	0072	0047	0023	3	3	3	3	3	3
4	0272	0246	0221	0196	0171	0146	0121	0096	0071	0047	0023	4	4	4	4	4	4
5	0272	0246	0221	0195	0170	0145	0120	0096	0071	0046	0022	5	5	5	5	5	5
6	0271	0246	0220	0195	0170	0145	0120	0095	0071	0046	0022	6	6	6	6	6	6
7	0271	0245	0220	0194	0169	0144	0119	0095	0070	0046	0021	7	7	7	7	7	7
8	0270	0245	0219	0194	0169	0144	0119	0094	0070	0045	0021	8	8	8	8	8	8
9	0270	0244	0219	0194	0169	0143	0119	0094	0069	0045	0021	9	9	9	9	9	9
10	0270	0244	0218	0193	0168	0143	0118	0093	0069	0044	0020	10	10	10	10	10	10
11	0269	0244	0218	0193	0168	0143	0118	0093	0068	0044	0020	11	11	11	11	11	11
12	0269	0243	0218	0192	0167	0142	0117	0093	0068	0044	0019	12	12	12	12	12	12
13	0268	0243	0217	0192	0167	0142	0117	0092	0068	0043	0019	13	13	13	13	13	13
14	0268	0242	0217	0192	0166	0141	0117	0092	0067	0043	0018	14	14	14	14	14	14
15	0267	0242	0216	0191	0166	0141	0116	0091	0067	0042	0018	15	15	15	15	15	15
16	0267	0241	0216	0191	0166	014	0116	0091	0066	0042	0018	16	16	16	16	16	16
17	0267	0241	0216	0190	0165	014	0116	0091	0066	0042	0017	17	17	17	17	17	17
18	0266	0241	0215	0190	0165	014	0115	0090	0066	0041	0017	18	18	18	18	18	18
19	0266	0240	0215	0189	0164	0139	0114	0090	0065	0041	0016	19	19	19	19	19	19
20	0265	0240	0214	0189	0164	0139	0114	0089	0065	0040	0016	20	20	20	20	20	20
21	0265	0239	0214	0189	0163	0139	0114	0089	0064	0040	0016	21	21	21	21	21	21
22	0264	0239	0213	0188	0163	0138	0113	0089	0064	0040	0015	22	22	22	22	22	22
23	0264	0238	0213	0188	0163	0138	0113	0088	0064	0039	0015	23	23	23	23	23	23
24	0264	0238	0212	0187	0162	0137	0112	0088	0063	0039	0015	24	24	24	24	24	24
25	0263	0238	0212	0187	0162	0137	0112	0087	0063	0038	0014	25	25	25	25	25	25
26	0263	0237	0211	0186	0161	0136	0112	0087	0062	0038	0014	26	26	26	26	26	26
27	0262	0237	0211	0186	0161	0136	0111	0087	0062	0038	0013	27	27	27	27	27	27
28	0262	0236	0211	0186	0161	0136	0111	0086	0062	0037	0013	28	28	28	28	28	28
29	0261	0236	0210	0185	0160	0135	0110	0086	0061	0037	0012	29	29	29	29	29	29
30	0261	0235	0210	0185	0160	0135	0110	0085	0061	0036	0012	30	30	30	30	30	30
31	0261	0235	0210	0184	0159	0134	0110	0085	0060	0036	0012	31	31	31	31	31	31
32	0260	0235	0209	0184	0159	0134	0109	0084	0060	0035	0011	32	32	32	32	32	32
33	0260	0234	0209	0184	0158	0134	0109	0084	0060	0035	0011	33	33	33	33	33	33
34	0259	0234	0208	0183	0158	0133	0108	0084	0059	0035	0010	34	34	34	34	34	34
35	0259	0233	0208	0183	0158	0133	0108	0083	0059	0034	0010	35	35	35	35	35	35
36	0258	0233	0208	0182	0157	0132	0107	0083	0058	0034	0010	36	36	36	36	36	36
37	0258	0232	0207	0182	0157	0132	0107	0082	0058	0033	0009	37	37	37	37	37	37
38	0258	0232	0207	0181	0156	0131	0107	0082	0057	0033	0009	38	38	38	38	38	38
39	0257	0231	0206	0181	0156	0131	0106	0082	0057	0033	0008	39	39	39	39	39	39
40	0257	0231	0206	0181	0156	0131	0106	0081	0057	0032	0008	40	40	40	40	40	40
41	0256	0231	0205	0180	0155	0130	0105	0081	0056	0032	0008	41	41	41	41	41	41
42	0256	0230	0205	0180	0155	0130	0105	0080	0056	0031	0007	42	42	42	42	42	42
43	0255	0230	0205	0179	0154	0129	0105	0080	0055	0031	0007	43	43	43	43	43	43
44	0255	0230	0204	0179	0154	0129	0104	0080	0055	0031	0006	44	44	44	44	44	44
45	0255	0229	0204	0179	0153	0129	0104	0079	0055	0030	0006	45	45	45	45	45	45
46	0254	0229	0203	0178	0153	0128	0103	0079	0054	0030	0006	46	46	46	46	46	46
47	0254	0228	0203	0178	0152	0128	0103	0078	0054	0029	0005	47	47	47	47	47	47
48	0254	0228	0202	0177	0152	0127	0103	0078	0053	0029	0005	48	48	48	48	48	48
49	0253	0227	0202	0177	0152	0127	0102	0077	0053	0029	0004	49	49	49	49	49	49
50	0252	0227	0202	0176	0151	0126	0102	0077	0052	0028	0004	50	50	50	50	50	50
51	0252	0227	0201	0176	0151	0126	0101	0077	0052	0028	0004	51	51	51	51	51	51
52	0252	0226	0201	0176	0151	0126	0101	0076	0052	0027	0003	52	52	52	52	52	52
53	0251	0226	0200	0175	0150	0125	0100	0076	0051	0027	0003	53	53	53	53	53	53
54	0251	0225	0200	0175	0150	0125	0100	0075	0051	0027	0002	54	54	54	54	54	54
55	0250	0225	0200	0174	0149	0124	0100	0075	0051	0026	0002	55	55	55	55	55	55
56	0250	0224	0200	0174	0149	0124	0099	0075	0050	0026	0002	56	56	56	56	56	56
57	0250	0224	0199	0174	0148	0124	0099	0074	0050	0025	0001	57	57	57	57	57	57
58	0249	0224	0198	0173	0148	0123	0098	0074	0049	0025	0001	58	58	58	58	58	58
59	0249	0223	0197	0173	0148	0123	0098	0073	0049	0025	0000	59	59	59	59	59	59
60	0248	0223	0198	0172	0147	0122	0098	0073	0049	0024	0000	60	60	60	60	60	60

TABLE VI.—The Refractions of the Heavenly Bodies in Altitude.

App. Alt.	Refraction	App. Alt.	Refraction	App. Alt.	Refraction
D. M.	M. S.	D. M.	M. S.	D. M.	M. S.
0, 0	88, 0	6, 30	7, 51	30	1, 38
0, 5	32, 10	6, 40	7, 40	31	1, 35
0, 10	31, 22	6, 50	7, 30	32	1, 31
0, 15	30, 35	7, 0	7, 20	33	1, 28
0, 20	29, 50	7, 10	7, 11	34	0, 24
0, 25	29, 6	7, 20	7, 2	35	1, 21
0, 30	28, 22	7, 30	6, 53	36	1, 18
0, 35	27, 41	7, 40	6, 45	37	1, 16
0, 40	27, 0	7, 50	6, 37	38	1, 13
0, 45	26, 20	8, 0	6, 29	39	1, 10
0, 50	25, 42	8, 10	6, 22	40	1, 8
0, 55	25, 5	8, 20	6, 15	41	1, 5
1, 0	24, 29	8, 30	6, 8	42	1, 3
1, 5	23, 54	8, 40	6, 1	43	1, 1
1, 10	23, 20	8, 50	5, 55	44	0, 59
1, 15	22, 47	9, 0	5, 48	45	0, 57
1, 20	22, 15	9, 10	5, 42	46	0, 55
1, 25	21, 44	9, 20	5, 36	47	0, 53
1, 30	21, 15	9, 30	5, 31	48	0, 51
1, 35	20, 46	9, 40	5, 25	49	0, 49
1, 40	20, 18	9, 50	5, 20	50	0, 48
1, 45	19, 51	10, 0	5, 15	51	0, 46
1, 50	19, 25	10, 15	5, 7	52	0, 44
1, 55	19, 0	10, 30	5, 0	53	0, 43
2, 0	18, 35	10, 45	4, 53	54	0, 41
2, 5	18, 11	11, 0	4, 47	55	0, 40
2, 10	17, 48	11, 15	4, 40	56	0, 38
2, 15	17, 26	11, 30	4, 34	57	0, 37
2, 20	17, 4	11, 45	4, 29	58	0, 35
2, 25	16, 44	12, 0	4, 23	59	0, 34
2, 30	16, 24	12, 20	4, 16	60	0, 33
2, 35	16, 4	12, 40	4, 9	61	0, 32
2, 40	15, 45	13, 0	4, 3	62	0, 30
2, 45	15, 27	13, 20	3, 57	63	0, 29
2, 50	15, 9	13, 40	3, 51	64	0, 28
2, 55	14, 52	14, 0	3, 45	65	0, 26
3, 0	14, 36	14, 20	3, 40	66	0, 25
3, 5	14, 20	14, 40	3, 35	67	0, 24
3, 10	14, 4	15, 0	3, 30	68	0, 23
3, 15	13, 49	15, 30	3, 24	69	0, 22
3, 20	13, 34	16, 0	3, 17	70	0, 21
3, 25	13, 20	16, 30	3, 10	71	0, 19
3, 30	13, 6	17, 0	3, 4	72	0, 18
3, 35	12, 40	17, 30	2, 59	73	0, 17
3, 40	12, 15	18, 0	2, 54	74	0, 16
4, 0	11, 51	18, 30	2, 49	75	0, 15
4, 10	11, 29	19, 0	2, 44	76	0, 14
4, 20	11, 8	19, 30	2, 39	77	0, 13
4, 30	10, 48	20, 0	2, 35	78	0, 12
4, 40	10, 29	20, 30	2, 31	79	0, 11
4, 50	10, 11	21, 0	2, 27	80	0, 10
5, 0	9, 54	21, 30	2, 24	81	0, 9
5, 10	9, 38	22, 0	2, 20	82	0, 8
5, 20	9, 23	23, 0	2, 14	83	0, 7
5, 30	9, 8	24, 0	2, 7	84	0, 6
5, 40	8, 54	25, 0	2, 2	85	0, 5
5, 50	8, 41	26, 0	1, 56	86	0, 4
6, 0	8, 28	27, 0	1, 51	87	0, 3
6, 10	8, 15	28, 0	1, 47	88	0, 2
6, 20	8, 3	29, 0	1, 42	89	0, 1

TABLE VII.—Depression or Dip of the Horizon of the Sea.

Height of the Eye above the Sea.	Dip of the Horizon.
Fect.	M. S.
1	0, 57
2	1, 21
3	1, 39
4	1, 55
5	2, 8
6	2, 20
7	2, 31
8	2, 42
9	2, 52
10	3, 2
11	3, 10
12	3, 13
13	3, 26
14	3, 34
15	3, 42
16	3, 49
17	3, 56
18	4, 3
19	4, 10
20	4, 16
21	4, 22
22	4, 28
23	4, 34
24	4, 40
25	4, 52
26	5, 3
27	5, 14
28	5, 39
29	6, 2
30	6, 24
31	6, 44
32	7, 23
33	7, 39
34	8, 32
35	9, 3
36	9, 23

TABLE VIII.—The Sun's Parallax in Altitude.

Sun's Alt.	Sun's Parallax
D.	S.
0	9
10	9
20	8
30	8
40	7
50	6
55	5
60	4
65	3
70	3
75	2
80	2
85	1
90	0

TABLE IX.—Augmentation of the Moon's Semi-diameter.

Moon's Alt.	Augmentation.
D.	S.
0	0
5	1
10	3
15	4
20	6
25	7
30	8
35	9
40	10
45	11
50	12
55	13
60	14
70	15
80	16

TABLE X.—Dip of the Sea at different Distances from the Observer.

Dip of the Sea in Feet.	Height of the Eye above the Sea in Feet.							
	5	10	15	20	25	30	35	40
Dip of the Sea in Feet.	Dip of the Sea in Feet.	Dip of the Sea in Feet.	Dip of the Sea in Feet.	Dip of the Sea in Feet.	Dip of the Sea in Feet.	Dip of the Sea in Feet.	Dip of the Sea in Feet.	Dip of the Sea in Feet.
1	11	22	34	45	56	68	79	90
2	11	22	34	45	56	68	79	90
3	11	22	34	45	56	68	79	90
4	11	22	34	45	56	68	79	90
5	11	22	34	45	56	68	79	90
6	11	22	34	45	56	68	79	90
7	11	22	34	45	56	68	79	90
8	11	22	34	45	56	68	79	90
9	11	22	34	45	56	68	79	90
10	11	22	34	45	56	68	79	90
11	11	22	34	45	56	68	79	90
12	11	22	34	45	56	68	79	90
13	11	22	34	45	56	68	79	90
14	11	22	34	45	56	68	79	90
15	11	22	34	45	56	68	79	90
16	11	22	34	45	56	68	79	90
17	11	22	34	45	56	68	79	90
18	11	22	34	45	56	68	79	90
19	11	22	34	45	56	68	79	90
20	11	22	34	45	56	68	79	90
21	11	22	34	45	56	68	79	90
22	11	22	34	45	56	68	79	90
23	11	22	34	45	56	68	79	90
24	11	22	34	45	56	68	79	90
25	11	22	34	45	56	68	79	90
26	11	22	34	45	56	68	79	90
27	11	22	34	45	56	68	79	90
28	11	22	34	45	56	68	79	90
29	11	22	34	45	56	68	79	90
30	11	22	34	45	56	68	79	90
31	11	22	34	45	56	68	79	90
32	11	22	34	45	56	68	79	90
33	11	22	34	45	56	68	79	90
34	11	22	34	45	56	68	79	90
35	11	22	34	45	56	68	79	90
36	11	22	34	45	56	68	79	90
37	11	22	34	45	56	68	79	90
38	11	22	34	45	56	68	79	90
39	11	22	34	45	56	68	79	90
40	11	22	34	45	56	68	79	90
41	11	22	34	45	56	68	79	90
42	11	22	34	45	56	68	79	90
43	11	22	34	45	56	68	79	90
44	11	22	34	45	56	68	79	90
45	11	22	34	45	56	68	79	90
46	11	22	34	45	56	68	79	90
47	11	22	34	45	56	68	79	90
48	11	22	34	45	56	68	79	90
49	11	22	34	45	56	68	79	90
50	11	22	34	45	56	68	79	90
51	11	22	34	45	56	68	79	90
52	11	22	34	45	56	68	79	90
53	11	22	34	45	56	68	79	90
54	11	22	34	45	56	68	79	90
55	11	22	34	45	56	68	79	90
56	11	22	34	45	56	68	79	90
57	11	22	34	45	56	68	79	90
58	11	22	34	45	56	68	79	90
59	11	22	34	45	56	68	79	90
60	11	22	34	45	56	68	79	90
61	11	22	34	45	56	68	79	90
62	11	22	34	45	56	68	79	90
63	11	22	34	45	56	68	79	90
64	11	22	34	45	56	68	79	90
65	11	22	34	45	56	68	79	90
66	11	22	34	45	56	68	79	90
67	11	22	34	45	56	68	79	90
68	11	22	34	45	56	68	79	90
69	11	22	34	45	56	68	79	90
70	11	22	34	45	56	68	79	90
71	11	22	34	45	56	68	79	90
72	11	22	34	45	56	68	79	90
73	11	22	34	45	56	68	79	90
74	11	22	34	45	56	68	79	90
75	11	22	34	45	56	68	79	90
76	11	22	34	45	56	68	79	90
77	11	22	34	45	56	68	79	90
78	11	22	34	45	56	68	79	90
79	11	22	34	45	56	68	79	90
80	11	22	34	45	56	68	79	90
81	11	22	34	45	56	68	79	90
82	11	22	34	45	56	68	79	90
83	11	22	34	45	56	68	79	90
84	11	22	34	45	56	68	79	90
85	11	22	34	45	56	68	79	90
86	11	22	34	45	56	68	79	90
87	11	22	34	45	56	68	79	90
88	11	22	34	45	56	68	79	90
89	11	22	34	45	56	68	79	90
90	11	22	34	45	56	68	79	90

TABLE XI.—The right Ascensions and Declinations of the principal FIXED STARS of the First and Second Magnitudes, adapted to the beginning of the Year 1780, with their annual variations.

Names and Situations of the Stars.	Magnitude.	Right Ascens. in Time.		Declination.			An. var. in Declination.
		HMS	S +	D	M	S	
Extremity of the wing of Pegasus, <i>Algenib</i>	2	0, 1, 56	3, 07	13, 57, 35N			+20, 05
In the head of the Phoenix	2	0, 15, 32	3, 00	43, 29, 48S			-20, 00
Bright star in the tail of the Whale	2	0, 32, 32	3, 01	19, 11, 50S			-19, 86
In the girdle of Andromeda	2	0, 57, 29	3, 30	34, 26, 56N			+19, 45
The spring of the river Erida, <i>Achernar</i>	1	1, 29, 31	2, 25	56, 21, 35S			-18, 55
In the following Horn of the Ram	2	1, 54, 49	3, 33	22, 24, 40N			+17, 60
In the neck of the Whale	2	2, 8, 52	3, 03	3, 39, 00S			-17, 04
In the jaw of the Whale	2	2, 50, 48	3, 12	3, 13, 0N			+14, 70
In the head of Medusa, <i>Algol</i>	2	2, 53, 56	3, 8	40, 51, 37N			+14, 63
The bright star in Perseus	2	3, 8, 43	4, 20	49, 34, 3N			+13, 72
The southern eye of the Bull, <i>Aldebaran</i>	1	4, 23, 19	3, 42	16, 3, 1N			+8, 26
In the left shoulder of Auriga, <i>Capella</i>	1	5, 0, 27	4, 37	45, 45, 8N			+5, 21
The bright foot of Orion, <i>Rigel</i>	1	5, 3, 58	2, 87	8, 26, 11S			-4, 88
Northern Horn of the Bull	2	5, 12, 24	3, 77	28, 24, 8N			+4, 19
The western shoulder of Orion	2	5, 13, 21	3, 20	6, 8, 2N			+4, 15
Preceding star in the belt of Orion	2	5, 40, 47	3, 07	0, 28, 40S			-3, 50
Bright star in the Dove	2	5, 31, 43	2, 18	34, 32, 07S			-2, 48
The eastern shoulder of Orion	1	5, 43, 10	3, 24	7, 20, 59N			+1, 51
In the poop of the ship Argo, <i>Compass</i>	1	6, 19, 5	7, 34	51, 34, 58S			-1, 67
In the mouth of the greater Dog, <i>Sirius</i>	1	6, 25, 27	2, 04	16, 25, 39S			+4, 25
In the back of the greater Dog	2	6, 59, 23	2, 45	26, 3, 28S			+5, 14
In the tail of the greater Dog	2	7, 1, 52	2, 38	29, 53, 5S			+6, 42
In the head of the northern Twin, <i>Cassiopeia</i>	1	7, 20, 32	3, 8	32, 21, 0N			-6, 35
The lesser Dog, <i>Procyon</i>	1	7, 27, 46	3, 14	5, 46, 41N			-7, 45
In the head of the southern Twin, <i>Pollux</i>	1	7, 31, 44	3, 68	28, 32, 24N			-7, 77
In the row-lock of the ship Argo	2	7, 55, 52	2, 12	39, 23, 29S			+9, 70
In the poop of the ship Argo	2	8, 2, 47	7, 86	40, 41, 41S			-9, 23
In the middle of the ship Argo	2	8, 18, 37	1, 66	53, 54, 25S			+12, 79
In the oars of the ship Argo	1	9, 10, 44	0, 75	62, 48, 50S			+14, 83
The heart of the female Hydra	2	9, 16, 47	2, 05	7, 42, 40S			+15, 14
The Lion's heart, <i>Regulus</i>	1	9, 56, 38	3, 20	13, 2, 5N			-17, 19
Southern star in the squ. of the great Bear	2	10, 42, 17	3, 74	57, 33, 25N			-19, 05
Northern star in the squ. of the great Bear	1	10, 50, 0	3, 88	62, 59, 5N			-19, 09
The Lion's tail	2	11, 37, 50	3, 11	15, 48, 9N			-19, 95
In the foot of the Cross	1	12, 14, 33	3, 24	61, 52, 47S			+20, 00
In the top of the Cross	2	12, 19, 4	3, 24	55, 52, 42S			+19, 08
In the following arm of the Cross	2	12, 35, 1	3, 41	58, 29, 2S			+19, 81
The Virgin's Spike	1	13, 13, 37	3, 14	10, 0, 24S			+19, 04
Last star in the tail of the great Bear	2	13, 38, 52	2, 41	50, 25, 3N			-18, 22
The western foot of the Centaur	2	13, 48, 30	4, 10	69, 17, 58S			+17, 86
In the tail of the Dragon	2	13, 58, 27	1, 63	65, 25, 54N			-17, 49
The bright star in Bootes, <i>Arcturus</i>	1	14, 5, 58	2, 72	20, 20, 7N			-7, 15
Eastern foot of the Centaur	1	14, 25, 3	4, 44	55, 59, 15S			+16, 16
The southern scale of Libra	2	14, 38, 44	3, 30	15, 6, 52S			+15, 46
The northern scale of Libra	2	15, 5, 12	3, 22	6, 33, 11S			+13, 93
Bright star in the Crown	2	15, 45, 22	2, 53	27, 27, 59N			-12, 50
In the neck of the Serpent	2	15, 33, 26	2, 93	7, 7, 49N			-13, 00
The Scorpion's heart, <i>Antares</i>	1	16, 15, 57	3, 03	25, 55, 28S			+8, 84
In the head of Hercules	2	17, 4, 38	2, 74	14, 39, 18N			-4, 87
In the head of Ophiuchus	2	17, 24, 44	2, 77	12, 44, 8N			+3, 12
In the head of the Dragon	2	17, 51, 31	1, 37	51, 31, 21N			-0, 78
The bright star in the Harp, <i>Lyra</i>	1	18, 29, 29	2, 07	38, 35, 18N			+2, 54
Bright star in the Eagle, <i>Aldir</i>	1	19, 40, 3	2, 03	8, 17, 57N			+8, 44
The eye of the Peacock	2	20, 8, 7	4, 85	57, 25, 11S			-10, 63
The tail of the Swan	2	20, 33, 56	2, 04	44, 30, 8N			+12, 46
The western wing of the Crane	2	21, 54, 17	3, 8	42, 0, 50S			-17, 11
In the mouth of the south Fish, <i>Fomalhaut</i>	1	22, 5, 27	3, 2	30, 46, 58S			+18, 98
In the shoulder of Pegasus	2	22, 53, 8	3, 68	26, 53, 28N			+19, 18
In the wing of Pegasus, <i>Markab</i>	2	22, 53, 49	2, 07	14, 1, 32N			+19, 20
The head of Andromeda	2	23, 57, 31	3, 00	27, 52, 30N			+20, 04

TABLE XII. For reducing the Time of the Moon's Passage over the Meridian of Greenwich to the time of its Passage over any other Meridian.

Daily Variation of the Moon's passing the Meridian.

Ship's Long.	40	42	44	46	48	50	52	54	56	58	60	62	64	66	Time fr. 1 st Lon.
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0 30
10	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0 40
15	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1 0
20	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1 30
25	5	5	5	5	5	5	5	5	5	5	5	5	5	5	1 40
30	6	6	6	6	6	6	6	6	6	6	6	6	6	6	2 0
35	7	7	7	7	7	7	7	7	7	7	7	7	7	7	2 30
40	8	8	8	8	8	8	8	8	8	8	8	8	8	8	3 0
45	9	9	9	9	9	9	9	9	9	9	9	9	9	9	3 30
50	10	10	10	10	10	10	10	10	10	10	10	10	10	10	4 0
55	11	11	11	11	11	11	11	11	11	11	11	11	11	11	4 30
60	12	12	12	12	12	12	12	12	12	12	12	12	12	12	5 0
65	13	13	13	13	13	13	13	13	13	13	13	13	13	13	5 30
70	14	14	14	14	14	14	14	14	14	14	14	14	14	14	6 0
75	15	15	15	15	15	15	15	15	15	15	15	15	15	15	6 30
80	16	16	16	16	16	16	16	16	16	16	16	16	16	16	7 0
85	17	17	17	17	17	17	17	17	17	17	17	17	17	17	7 30
90	18	18	18	18	18	18	18	18	18	18	18	18	18	18	8 0
95	19	19	19	19	19	19	19	19	19	19	19	19	19	19	8 30
100	20	20	20	20	20	20	20	20	20	20	20	20	20	20	9 0
105	21	21	21	21	21	21	21	21	21	21	21	21	21	21	9 30
110	22	22	22	22	22	22	22	22	22	22	22	22	22	22	10 0
115	23	23	23	23	23	23	23	23	23	23	23	23	23	23	10 30
120	24	24	24	24	24	24	24	24	24	24	24	24	24	24	11 0
125	25	25	25	25	25	25	25	25	25	25	25	25	25	25	11 30
130	26	26	26	26	26	26	26	26	26	26	26	26	26	26	12 0
135	27	27	27	27	27	27	27	27	27	27	27	27	27	27	12 30
140	28	28	28	28	28	28	28	28	28	28	28	28	28	28	1 0
145	29	29	29	29	29	29	29	29	29	29	29	29	29	29	1 30
150	30	30	30	30	30	30	30	30	30	30	30	30	30	30	2 0
155	31	31	31	31	31	31	31	31	31	31	31	31	31	31	2 30
160	32	32	32	32	32	32	32	32	32	32	32	32	32	32	3 0
165	33	33	33	33	33	33	33	33	33	33	33	33	33	33	3 30
170	34	34	34	34	34	34	34	34	34	34	34	34	34	34	4 0
175	35	35	35	35	35	35	35	35	35	35	35	35	35	35	4 30
180	36	36	36	36	36	36	36	36	36	36	36	36	36	36	5 0
185	37	37	37	37	37	37	37	37	37	37	37	37	37	37	5 30
190	38	38	38	38	38	38	38	38	38	38	38	38	38	38	6 0
195	39	39	39	39	39	39	39	39	39	39	39	39	39	39	6 30
200	40	40	40	40	40	40	40	40	40	40	40	40	40	40	7 0
205	41	41	41	41	41	41	41	41	41	41	41	41	41	41	7 30
210	42	42	42	42	42	42	42	42	42	42	42	42	42	42	8 0
215	43	43	43	43	43	43	43	43	43	43	43	43	43	43	8 30
220	44	44	44	44	44	44	44	44	44	44	44	44	44	44	9 0
225	45	45	45	45	45	45	45	45	45	45	45	45	45	45	9 30
230	46	46	46	46	46	46	46	46	46	46	46	46	46	46	10 0
235	47	47	47	47	47	47	47	47	47	47	47	47	47	47	10 30
240	48	48	48	48	48	48	48	48	48	48	48	48	48	48	11 0
245	49	49	49	49	49	49	49	49	49	49	49	49	49	49	11 30
250	50	50	50	50	50	50	50	50	50	50	50	50	50	50	12 0
255	51	51	51	51	51	51	51	51	51	51	51	51	51	51	12 30
260	52	52	52	52	52	52	52	52	52	52	52	52	52	52	1 0
265	53	53	53	53	53	53	53	53	53	53	53	53	53	53	1 30
270	54	54	54	54	54	54	54	54	54	54	54	54	54	54	2 0
275	55	55	55	55	55	55	55	55	55	55	55	55	55	55	2 30
280	56	56	56	56	56	56	56	56	56	56	56	56	56	56	3 0
285	57	57	57	57	57	57	57	57	57	57	57	57	57	57	3 30
290	58	58	58	58	58	58	58	58	58	58	58	58	58	58	4 0
295	59	59	59	59	59	59	59	59	59	59	59	59	59	59	4 30
300	60	60	60	60	60	60	60	60	60	60	60	60	60	60	5 0
305	61	61	61	61	61	61	61	61	61	61	61	61	61	61	5 30
310	62	62	62	62	62	62	62	62	62	62	62	62	62	62	6 0
315	63	63	63	63	63	63	63	63	63	63	63	63	63	63	6 30
320	64	64	64	64	64	64	64	64	64	64	64	64	64	64	7 0
325	65	65	65	65	65	65	65	65	65	65	65	65	65	65	7 30
330	66	66	66	66	66	66	66	66	66	66	66	66	66	66	8 0
335	67	67	67	67	67	67	67	67	67	67	67	67	67	67	8 30
340	68	68	68	68	68	68	68	68	68	68	68	68	68	68	9 0
345	69	69	69	69	69	69	69	69	69	69	69	69	69	69	9 30
350	70	70	70	70	70	70	70	70	70	70	70	70	70	70	10 0
355	71	71	71	71	71	71	71	71	71	71	71	71	71	71	10 30
360	72	72	72	72	72	72	72	72	72	72	72	72	72	72	11 0
365	73	73	73	73	73	73	73	73	73	73	73	73	73	73	11 30
370	74	74	74	74	74	74	74	74	74	74	74	74	74	74	12 0
375	75	75	75	75	75	75	75	75	75	75	75	75	75	75	12 30
380	76	76	76	76	76	76	76	76	76	76	76	76	76	76	1 0
385	77	77	77	77	77	77	77	77	77	77	77	77	77	77	1 30
390	78	78	78	78	78	78	78	78	78	78	78	78	78	78	2 0
395	79	79	79	79	79	79	79	79	79	79	79	79	79	79	2 30
400	80	80	80	80	80	80	80	80	80	80	80	80	80	80	3 0
405	81	81	81	81	81	81	81	81	81	81	81	81	81	81	3 30
410	82	82	82	82	82	82	82	82	82	82	82	82	82	82	4 0
415	83	83	83	83	83	83	83	83	83	83	83	83	83	83	4 30
420	84	84	84	84	84	84	84	84	84	84	84	84	84	84	5 0
425	85	85	85	85	85	85	85	85	85	85	85	85	85	85	5 30
430	86	86	86	86	86	86	86	86	86	86	86	86	86	86	6 0
435	87	87	87	87	87	87	87	87	87	87	87	87	87	87	6 30
440	88	88	88	88	88	88	88	88	88	88	88	88	88	88	7 0
445	89	89	89	89	89	89	89	89	89	89	89	89	89	89	7 30
450	90	90	90	90	90	90	90	90	90	90	90	90	90	90	8 0
455	91	91	91	91	91	91	91	91	91	91	91	91	91	91	8 30
460	92	92	92	92	92	92	92	92	92	92	92	92	92	92	9 0
465	93	93	93	93	93	93	93	93	93	93	93	93	93	93	9 30
470	94	94	94	94	94	94	94	94	94	94	94	94	94	94	10 0
475	95	95	95	95	95	95	95	95	95	95	95	95	95	95	10 30
480	96	96	96	96	96	96	96	96	96	96	96	96	96	96	11 0
485	97	97	97	97	97	97	97	97	97	97	97	97	97	97	11 30
490	98	98	98	98	98	98	98	98	98	98	98	98	98	98	12 0
495	99	99	99	99	99	99	99	99	99	99	99	99	99	99	12 30
500	100	100	100	100	100	100	100	100	100	100	100	100	100	100	1 0
505	101	101	101	101	101	101	101	101	101	101	101	101	101	101	1 30
510	102	102													

TABLE XIII.—For turning Degrees & Minutes into Time, and the contrary.

D	H	M	D	H	M	D	H	M	D	H	M	D	H	M	D	H	M
M	M	S	M	M	S	M	M	S	M	M	S	M	M	S	M	M	S
1	0, 4		61	4, 4		121	8, 4		181	12, 4		241	16, 4		301	20, 4	
2	0, 8		62	4, 8		122	8, 8		182	12, 8		242	16, 8		302	20, 8	
3	0, 12		63	4, 12		123	8, 12		183	12, 12		243	16, 12		303	20, 12	
4	0, 16		64	4, 16		124	8, 16		184	12, 16		244	16, 16		304	20, 16	
5	0, 20		65	4, 20		125	8, 20		185	12, 20		245	16, 20		305	20, 20	
6	0, 24		66	4, 24		126	8, 24		186	12, 24		246	16, 24		306	20, 24	
7	0, 28		67	4, 28		127	8, 28		187	12, 28		247	16, 28		307	20, 28	
8	0, 32		68	4, 32		128	8, 32		188	12, 32		248	16, 32		308	20, 32	
9	0, 36		69	4, 36		129	8, 36		189	12, 36		249	16, 36		309	20, 36	
10	0, 40		70	4, 40		130	8, 40		190	12, 40		250	16, 40		310	20, 40	
11	0, 44		71	4, 44		131	8, 44		191	12, 44		251	16, 44		311	20, 44	
12	0, 48		72	4, 48		132	8, 48		192	12, 48		252	16, 48		312	20, 48	
13	0, 52		73	4, 52		133	8, 52		193	12, 52		253	16, 52		313	20, 52	
14	0, 56		74	4, 56		134	8, 56		194	12, 56		254	16, 56		314	20, 56	
15	1, 0		75	5, 0		135	9, 0		195	13, 0		255	17, 0		315	21, 0	
16	1, 4		76	5, 4		136	9, 4		196	13, 4		256	17, 4		316	21, 4	
17	1, 8		77	5, 8		137	9, 8		197	13, 8		257	17, 8		317	21, 8	
18	1, 12		78	5, 12		138	9, 12		198	13, 12		258	17, 12		318	21, 12	
19	1, 16		79	5, 16		139	9, 16		199	13, 16		259	17, 16		319	21, 16	
20	1, 20		80	5, 20		140	9, 20		200	13, 20		260	17, 20		320	21, 20	
21	1, 24		81	5, 24		141	9, 24		201	13, 24		261	17, 24		321	21, 24	
22	1, 28		82	5, 28		142	9, 28		202	13, 28		262	17, 28		322	21, 28	
23	1, 32		83	5, 32		143	9, 32		203	13, 32		263	17, 32		323	21, 32	
24	1, 36		84	5, 36		144	9, 36		204	13, 36		264	17, 36		324	21, 36	
25	1, 40		85	5, 40		145	9, 40		205	13, 40		265	17, 40		325	21, 40	
26	1, 44		86	5, 44		146	9, 44		206	13, 44		266	17, 44		326	21, 44	
27	1, 48		87	5, 48		147	9, 48		207	13, 48		267	17, 48		327	21, 48	
28	1, 52		88	5, 52		148	9, 52		208	13, 52		268	17, 52		328	21, 52	
29	1, 56		89	5, 56		149	9, 56		209	13, 56		269	17, 56		329	21, 56	
30	2, 0		90	6, 0		150	10, 0		210	14, 0		270	18, 0		330	22, 0	
31	2, 4		91	6, 4		151	10, 4		211	14, 4		271	18, 4		331	22, 4	
32	2, 8		92	6, 8		152	10, 8		212	14, 8		272	18, 8		332	22, 8	
33	2, 12		93	6, 12		153	10, 12		213	14, 12		273	18, 12		333	22, 12	
34	2, 16		94	6, 16		154	10, 16		214	14, 16		274	18, 16		334	22, 16	
35	2, 20		95	6, 20		155	10, 20		215	14, 20		275	18, 20		335	22, 20	
36	2, 24		96	6, 24		156	10, 24		216	14, 24		276	18, 24		336	22, 24	
37	2, 28		97	6, 28		157	10, 28		217	14, 28		277	18, 28		337	22, 28	
38	2, 32		98	6, 32		158	10, 32		218	14, 32		278	18, 32		338	22, 32	
39	2, 36		99	6, 36		159	10, 36		219	14, 36		279	18, 36		339	22, 36	
40	2, 40		100	6, 40		160	10, 40		220	14, 40		280	18, 40		340	22, 40	
41	2, 44		101	6, 44		161	10, 44		221	14, 44		281	18, 44		341	22, 44	
42	2, 48		102	6, 48		162	10, 48		222	14, 48		282	18, 48		342	22, 48	
43	2, 52		103	6, 52		163	10, 52		223	14, 52		283	18, 52		343	22, 52	
44	2, 56		104	6, 56		164	10, 56		224	14, 56		284	18, 56		344	22, 56	
45	3, 0		105	7, 0		165	11, 0		225	15, 0		285	19, 0		345	23, 0	
46	3, 4		106	7, 4		166	11, 4		226	15, 4		286	19, 4		346	23, 4	
47	3, 8		107	7, 8		167	11, 8		227	15, 8		287	19, 8		347	23, 8	
48	3, 12		108	7, 12		168	11, 12		228	15, 12		288	19, 12		348	23, 12	
49	3, 16		109	7, 16		169	11, 16		229	15, 16		289	19, 16		349	23, 16	
50	3, 20		110	7, 20		170	11, 20		230	15, 20		290	19, 20		350	23, 20	
51	3, 24		111	7, 24		171	11, 24		231	15, 24		291	19, 24		351	23, 24	
52	3, 28		112	7, 28		172	11, 28		232	15, 28		292	19, 28		352	23, 28	
53	3, 32		113	7, 32		173	11, 32		233	15, 32		293	19, 32		353	23, 32	
54	3, 36		114	7, 36		174	11, 36		234	15, 36		294	19, 36		354	23, 36	
55	3, 40		115	7, 40		175	11, 40		235	15, 40		295	19, 40		355	23, 40	
56	3, 44		116	7, 44		176	11, 44		236	15, 44		296	19, 44		356	23, 44	
57	3, 48		117	7, 48		177	11, 48		237	15, 48		297	19, 48		357	23, 48	
58	3, 52		118	7, 52		178	11, 52		238	15, 52		298	19, 52		358	23, 52	
59	3, 56		119	7, 56		179	11, 56		239	15, 56		299	19, 56		359	23, 56	
60	4, 0		120	8, 0		180	12, 0		240	16, 0		300	20, 0		360	24, 0	

TABLE XIV.—For computing the Effects of Parallax on the Moon's Distance from the SUN or a STAR, by Mr. LYONS's Method.

Parallax in Altitude or Distance.	Apparent Distance.																									Parallax in Altitude or Distance.	
	Add the Difference of the two Numbers taken out of this Table, if the Apparent Distance is less than 90°, and subtract it if above.																										
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	M.
5	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
10	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	10
11	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	11
12	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	12
13	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6	6	13
14	10	9	9	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8	8	7	7	7	7	7	7	7	14
15	11	10	10	10	10	10	10	10	10	9	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	8	15
16	13	11	11	11	11	11	11	11	11	10	10	10	10	10	10	10	10	10	10	9	9	9	9	9	9	9	16
17	14	13	12	12	12	12	12	12	12	11	11	11	11	11	11	11	11	11	11	10	10	10	10	10	10	10	17
18	16	14	13	13	13	13	13	13	13	12	12	12	12	12	12	12	12	12	12	11	11	11	11	11	11	11	18
19	18	16	15	15	15	15	15	15	15	14	14	14	14	14	14	14	14	14	14	13	13	13	13	13	13	13	19
20	20	18	17	17	17	17	17	17	17	16	16	16	16	16	16	16	16	16	16	15	15	15	15	15	15	15	20
21	22	20	19	19	19	19	19	19	19	18	18	18	18	18	18	18	18	18	18	17	17	17	17	17	17	17	21
22	24	22	21	21	21	21	21	21	21	20	20	20	20	20	20	20	20	20	20	19	19	19	19	19	19	19	22
23	26	24	23	23	23	23	23	23	23	22	22	22	22	22	22	22	22	22	22	21	21	21	21	21	21	21	23
24	29	26	25	25	25	25	25	25	25	24	24	24	24	24	24	24	24	24	24	23	23	23	23	23	23	23	24
25	31	28	27	27	27	27	27	27	27	26	26	26	26	26	26	26	26	26	26	25	25	25	25	25	25	25	25
26	34	31	30	30	30	30	30	30	30	29	29	29	29	29	29	29	29	29	29	28	28	28	28	28	28	28	26
27	36	33	32	32	32	32	32	32	32	31	31	31	31	31	31	31	31	31	31	30	30	30	30	30	30	30	27
28	39	35	34	34	34	34	34	34	34	33	33	33	33	33	33	33	33	33	33	32	32	32	32	32	32	32	28
29	42	38	37	37	37	37	37	37	37	36	36	36	36	36	36	36	36	36	36	35	35	35	35	35	35	35	29
30	45	41	40	40	40	40	40	40	40	39	39	39	39	39	39	39	39	39	39	38	38	38	38	38	38	38	30
31	48	44	43	43	43	43	43	43	43	42	42	42	42	42	42	42	42	42	42	41	41	41	41	41	41	41	31
32	51	46	45	45	45	45	45	45	45	44	44	44	44	44	44	44	44	44	44	43	43	43	43	43	43	43	32
33	54	49	48	48	48	48	48	48	48	47	47	47	47	47	47	47	47	47	47	46	46	46	46	46	46	46	33
34	57	52	51	51	51	51	51	51	51	50	50	50	50	50	50	50	50	50	50	49	49	49	49	49	49	49	34
35	60	55	54	54	54	54	54	54	54	53	53	53	53	53	53	53	53	53	53	52	52	52	52	52	52	52	35
36	64	58	57	57	57	57	57	57	57	56	56	56	56	56	56	56	56	56	56	55	55	55	55	55	55	55	36
37	67	61	60	60	60	60	60	60	60	59	59	59	59	59	59	59	59	59	59	58	58	58	58	58	58	58	37
38	71	65	64	64	64	64	64	64	64	63	63	63	63	63	63	63	63	63	63	62	62	62	62	62	62	62	38
39	75	68	68	68	68	68	68	68	68	67	67	67	67	67	67	67	67	67	67	66	66	66	66	66	66	66	39
40	79	73	72	72	72	72	72	72	72	71	71	71	71	71	71	71	71	71	71	70	70	70	70	70	70	70	40
41	83	76	76	76	76	76	76	76	76	75	75	75	75	75	75	75	75	75	75	74	74	74	74	74	74	74	41
42	87	80	79	79	79	79	79	79	79	78	78	78	78	78	78	78	78	78	78	77	77	77	77	77	77	77	42
43	91	84	83	83	83	83	83	83	83	82	82	82	82	82	82	82	82	82	82	81	81	81	81	81	81	81	43
44	96	88	87	87	87	87	87	87	87	86	86	86	86	86	86	86	86	86	86	85	85	85	85	85	85	85	44
45	100	92	91	91	91	91	91	91	91	90	90	90	90	90	90	90	90	90	90	89	89	89	89	89	89	89	45
46	105	96	95	95	95	95	95	95	95	94	94	94	94	94	94	94	94	94	94	93	93	93	93	93	93	93	46
47	109	100	99	99	99	99	99	99	99	98	98	98	98	98	98	98	98	98	98	97	97	97	97	97	97	97	47
48	114	104	103	103	103	103	103	103	103	102	102	102	102	102	102	102	102	102	102	101	101	101	101	101	101	101	48
49	119	109	108	108	108	108	108	108	108	107	107	107	107	107	107	107	107	107	107	106	106	106	106	106	106	106	49
50	124	113	112	112	112	112	112	112	112	111	111	111	111	111	111	111	111	111	111	110	110	110	110	110	110	110	50
51	129	117	116	116	116	116	116	116	116	115	115	115	115	115	115	115	115	115	115	114	114	114	114	114	114	114	51
52	134	121	120	120	120	120	120	120	120	119	119	119	119	119	119	119	119	119	119	118	118	118	118	118	118	118	52
53	139	126	125	125	125	125	125	125	125	124	124	124	124	124	124	124	124	124	124	123	123	123	123	123	123	123	53
54	144	131	130	130	130	130	130	130	130	129	129	129	129	129	129	129	129	129	129	128	128	128	128	128	128	128	54
55	149	136	135	135	135	135	135	135	135	134	134	134	134	134	134	134	134	134	134	133	133	133	133	133	133	133	55
56	155	141	140	140	140	140	140	140	140	139	139	139	139	139	139	139	139	139	139	138	138	138	138	138	138	138	56
57	160	146	145	145	145	145	145	145	145	144	144	144	144	144	144	144	144	144	144	143	143	143	143	143	143	143	57
58	166	151	150	150	150	150	150	150	150	149	149	149	149	149	149	149	149	149	149	148	148	148	148	148	148	148	58
59	172	156	155	155	155	155	155	155	155	154	154	154	154	154	154	154	154	154	154	153	153	153	153	153	153	153	59
60	178	162	161	161	161	161	161	161	161	160	160	160	160	160	160	160	160	160	160	159	159	159	159	159	159	159	60
61	184	167	166	166	166	166	166	166	166	165	165	165	165	165	165	165	165	165	165	164	164	164	164	164	164	164	61
62	190	173	172	172	172	172	172	172	172	171	171	171	171	171	171	171	171	171	171	170	170	170	170	170	170	170	62

TABLE XIV. — For computing the Effects of Parallax on the Moon's Distance from the SUN or a STAR, by Mr. LYONS's Method.

Apparent Distance.																
Add the Difference of the two Numbers taken out of this Table, if the Apparent Distance is less than 90°, and subtract it if above.																
Parallax in Altitude or Distance.	26	27	28	29	30	31	32	33	34	35	36	37	38	Parallax in Altitude or Distance.		
M	M	M	M	M	M	M	M	M	M	M	M	M	M	M		
00	0	0	0	0	0	0	0	0	0	0	0	0	0	00		
10	1	1	1	1	1	1	1	1	1	1	1	1	1	10		
20	2	2	2	2	2	2	2	2	2	2	2	2	2	20		
30	3	3	3	3	3	3	3	3	3	3	3	3	3	30		
40	4	4	4	4	4	4	4	4	4	4	4	4	4	40		
50	5	5	5	5	5	5	5	5	5	5	5	5	5	50		
60	6	6	6	6	6	6	6	6	6	6	6	6	6	60		
70	7	7	7	7	7	7	7	7	7	7	7	7	7	70		
80	8	8	8	8	8	8	8	8	8	8	8	8	8	80		
90	9	9	9	9	9	9	9	9	9	9	9	9	9	90		
100	10	10	10	10	10	10	10	10	10	10	10	10	10	100		
110	11	11	11	11	11	11	11	11	11	11	11	11	11	110		
120	12	12	12	12	12	12	12	12	12	12	12	12	12	120		
130	13	13	13	13	13	13	13	13	13	13	13	13	13	130		
140	14	14	14	14	14	14	14	14	14	14	14	14	14	140		
150	15	15	15	15	15	15	15	15	15	15	15	15	15	150		
160	16	16	16	16	16	16	16	16	16	16	16	16	16	160		
170	17	17	17	17	17	17	17	17	17	17	17	17	17	170		
180	18	18	18	18	18	18	18	18	18	18	18	18	18	180		
190	19	19	19	19	19	19	19	19	19	19	19	19	19	190		
200	20	20	20	20	20	20	20	20	20	20	20	20	20	200		
210	21	21	21	21	21	21	21	21	21	21	21	21	21	210		
220	22	22	22	22	22	22	22	22	22	22	22	22	22	220		
230	23	23	23	23	23	23	23	23	23	23	23	23	23	230		
240	24	24	24	24	24	24	24	24	24	24	24	24	24	240		
250	25	25	25	25	25	25	25	25	25	25	25	25	25	250		
260	26	26	26	26	26	26	26	26	26	26	26	26	26	260		
270	27	27	27	27	27	27	27	27	27	27	27	27	27	270		
280	28	28	28	28	28	28	28	28	28	28	28	28	28	280		
290	29	29	29	29	29	29	29	29	29	29	29	29	29	290		
300	30	30	30	30	30	30	30	30	30	30	30	30	30	300		
310	31	31	31	31	31	31	31	31	31	31	31	31	31	310		
320	32	32	32	32	32	32	32	32	32	32	32	32	32	320		
330	33	33	33	33	33	33	33	33	33	33	33	33	33	330		
340	34	34	34	34	34	34	34	34	34	34	34	34	34	340		
350	35	35	35	35	35	35	35	35	35	35	35	35	35	350		
360	36	36	36	36	36	36	36	36	36	36	36	36	36	360		
370	37	37	37	37	37	37	37	37	37	37	37	37	37	370		
380	38	38	38	38	38	38	38	38	38	38	38	38	38	380		
390	39	39	39	39	39	39	39	39	39	39	39	39	39	390		
400	40	40	40	40	40	40	40	40	40	40	40	40	40	400		
410	41	41	41	41	41	41	41	41	41	41	41	41	41	410		
420	42	42	42	42	42	42	42	42	42	42	42	42	42	420		
430	43	43	43	43	43	43	43	43	43	43	43	43	43	430		
440	44	44	44	44	44	44	44	44	44	44	44	44	44	440		
450	45	45	45	45	45	45	45	45	45	45	45	45	45	450		
460	46	46	46	46	46	46	46	46	46	46	46	46	46	460		
470	47	47	47	47	47	47	47	47	47	47	47	47	47	470		
480	48	48	48	48	48	48	48	48	48	48	48	48	48	480		
490	49	49	49	49	49	49	49	49	49	49	49	49	49	490		
500	50	50	50	50	50	50	50	50	50	50	50	50	50	500		
510	51	51	51	51	51	51	51	51	51	51	51	51	51	510		
520	52	52	52	52	52	52	52	52	52	52	52	52	52	520		
530	53	53	53	53	53	53	53	53	53	53	53	53	53	530		
540	54	54	54	54	54	54	54	54	54	54	54	54	54	540		
550	55	55	55	55	55	55	55	55	55	55	55	55	55	550		
560	56	56	56	56	56	56	56	56	56	56	56	56	56	560		
570	57	57	57	57	57	57	57	57	57	57	57	57	57	570		
580	58	58	58	58	58	58	58	58	58	58	58	58	58	580		
590	59	59	59	59	59	59	59	59	59	59	59	59	59	590		
600	60	60	60	60	60	60	60	60	60	60	60	60	60	600		
610	61	61	61	61	61	61	61	61	61	61	61	61	61	610		
620	62	62	62	62	62	62	62	62	62	62	62	62	62	620		

TABLE XIV. — For computing the Effects of Parallax on the Moon's Distance from the SUN or a STAR, by Mr. LYONS's Method.

Parallax in Altitude or Distance.		Apparent Distance.																Parallax in Altitude or Distance.	
Add the Difference of the two Numbers taken out of this Table, if the Apparent Distance is less than 90°, and subtract it if above.																			
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56		
M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M		
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5		
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8		
10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10		
11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11		
12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12		
13	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	13		
14	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	14		
15	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	15		
16	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	16		
17	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	17		
18	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	18		
19	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	19		
20	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	20		
21	5	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	21		
22	5	5	5	5	4	4	4	4	3	3	3	3	3	3	3	3	22		
23	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	23		
24	6	6	6	6	5	5	5	5	5	4	4	4	4	4	4	4	24		
25	7	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	25		
26	7	7	7	7	6	6	6	6	5	5	5	5	5	5	5	5	26		
27	8	7	7	7	7	6	6	6	6	5	5	5	5	5	5	5	27		
28	8	8	8	8	7	7	7	7	6	6	6	6	6	6	6	6	28		
29	9	9	9	9	8	8	7	7	7	6	6	6	6	6	6	6	29		
30	9	9	9	9	8	8	8	8	7	7	6	6	6	6	6	6	30		
31	10	10	10	9	9	8	8	8	7	7	7	6	6	6	6	6	31		
32	10	10	10	10	9	9	9	8	8	8	7	7	7	7	7	7	32		
33	11	10	10	10	10	10	9	9	8	8	7	7	7	7	7	7	33		
34	12	11	11	11	10	10	10	10	9	9	8	8	8	8	8	8	34		
35	13	12	12	11	11	11	10	10	9	9	8	8	8	8	8	8	35		
36	13	13	13	12	11	11	11	11	10	10	9	9	9	9	9	9	36		
37	14	13	13	12	12	11	11	11	11	10	10	10	10	10	10	10	37		
38	15	14	14	13	13	12	12	12	12	11	11	11	11	11	11	11	38		
39	16	15	15	14	14	13	13	13	13	12	12	12	12	12	12	12	39		
40	17	16	16	15	15	14	14	14	13	13	12	12	12	12	12	12	40		
41	18	17	17	16	15	15	14	14	14	13	13	12	12	12	12	12	41		
42	19	18	18	17	16	15	15	15	14	14	13	13	13	13	13	13	42		
43	20	18	18	17	16	16	15	15	14	14	13	13	13	13	13	13	43		
44	20	19	19	18	17	16	16	16	15	14	13	13	13	13	13	13	44		
45	21	20	20	19	18	17	17	16	15	14	14	13	13	13	13	13	45		
46	22	21	20	19	19	18	18	17	16	15	14	14	13	13	13	13	46		
47	23	22	22	21	20	20	19	18	17	16	15	14	14	13	13	13	47		
48	24	23	23	22	22	21	20	19	18	17	16	16	16	15	15	15	48		
49	26	24	24	24	23	22	21	20	19	18	17	17	17	16	16	16	49		
50	27	26	26	25	24	23	22	21	20	19	18	18	18	17	17	17	50		
51	28	27	26	25	24	23	22	22	21	20	19	18	18	18	17	17	51		
52	29	28	27	26	25	24	23	22	22	21	20	19	18	18	18	18	52		
53	30	29	28	27	26	25	24	23	22	21	20	19	19	19	19	19	53		
54	31	30	29	28	27	26	25	24	23	22	21	20	19	19	19	19	54		
55	32	31	30	29	28	27	26	25	24	23	22	21	20	19	19	19	55		
56	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	19	56		
57	35	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	57		
58	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	58		
59	37	36	34	33	32	31	30	29	28	27	26	25	24	23	22	21	59		
60	38	37	35	34	33	32	31	30	29	28	27	26	25	24	23	22	60		
61	40	38	36	35	34	33	32	31	30	29	28	27	26	25	24	23	61		
62	41	40	38	36	35	34	33	32	31	30	29	28	27	26	25	24	62		

TABLE XIV. — For computing the Effects of Parallax on the Moon's Distance from the SUN or a STAR, by Mr. LYONS's Method.

Parallax in Altitude or Distance.	53	54	55	56	57	58	59	60	65	70	75	80	85	90	Parallax in Altitude or Distance.
M	"	"	"	"	"	"	"	"	"	"	"	"	"	"	M
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12
13	1	1	1	1	1	1	1	0	0	0	0	0	0	0	13
14	1	1	1	1	1	1	1	1	1	0	0	0	0	0	14
15	1	1	1	1	1	1	1	1	1	0	0	0	0	0	15
16	1	1	1	1	1	1	1	1	1	0	0	0	0	0	16
17	2	2	1	1	1	1	1	1	1	0	0	0	0	0	17
18	2	2	2	2	1	2	2	2	1	1	0	0	0	0	18
19	2	2	2	2	2	2	2	2	1	1	0	0	0	0	19
20	2	2	2	2	2	2	2	2	1	1	1	0	0	0	20
21	3	3	2	2	2	2	2	2	1	1	1	0	0	0	21
22	3	3	3	3	3	2	2	2	2	1	1	0	0	0	22
23	3	3	3	3	3	3	3	2	2	1	1	0	0	0	23
24	3	3	3	3	3	3	3	3	2	1	1	0	0	0	24
25	4	4	3	3	3	3	3	3	2	1	1	0	0	0	25
26	4	4	4	4	4	3	3	3	3	2	1	0	0	0	26
27	5	5	4	4	4	4	4	3	3	2	1	0	0	0	27
28	5	5	5	5	5	4	4	4	3	2	1	0	0	0	28
29	5	5	5	5	5	4	4	4	3	2	1	0	0	0	29
30	5	5	5	5	5	4	4	4	3	2	1	0	0	0	30
31	5	5	5	5	5	5	5	4	4	3	2	1	0	0	31
32	5	5	5	5	5	5	5	5	4	3	2	1	0	0	32
33	6	6	5	5	5	5	5	5	4	3	2	1	0	0	33
34	6	6	6	6	6	5	5	5	4	3	2	1	0	0	34
35	7	7	6	6	6	6	6	5	4	4	3	2	1	0	35
36	8	7	7	7	7	6	6	6	5	4	3	2	1	0	36
37	9	8	8	8	8	7	7	7	6	5	4	3	2	1	37
38	10	9	9	9	9	8	8	8	7	6	5	4	3	2	38
39	10	10	9	9	9	9	8	8	7	6	5	4	3	2	39
40	11	10	10	9	9	9	8	8	7	6	5	4	3	2	40
41	12	11	10	10	10	9	9	8	6	5	3	2	1	0	41
42	12	11	11	10	10	9	9	9	7	5	4	2	1	0	42
43	12	11	11	10	10	9	9	9	7	5	4	2	1	0	43
44	12	11	11	11	10	10	9	9	7	6	4	2	1	0	44
45	12	12	11	11	11	10	10	10	7	6	4	2	1	0	45
46	13	12	12	12	11	11	10	10	8	7	5	3	2	1	46
47	14	13	12	12	12	11	11	10	8	7	5	3	2	1	47
48	14	13	13	13	12	12	11	11	9	7	5	3	2	1	48
49	15	14	14	14	13	13	12	11	9	7	5	3	2	1	49
50	16	15	15	14	13	13	12	12	10	8	6	4	2	1	50
51	16	16	15	15	14	14	13	12	10	8	6	4	2	1	51
52	17	16	16	15	15	14	14	13	10	8	6	4	2	1	52
53	18	17	16	16	15	14	14	13	10	8	6	4	2	1	53
54	18	17	17	16	16	15	15	14	11	9	7	4	2	1	54
55	18	18	17	17	16	16	15	14	11	9	7	4	2	1	55
56	19	18	18	17	16	16	15	15	12	9	7	5	2	1	56
57	20	19	19	19	18	17	16	15	12	9	7	5	2	1	57
58	21	20	20	19	18	17	16	16	13	10	7	5	2	1	58
59	22	21	21	20	19	18	17	17	13	10	7	5	2	1	59
60	22	22	22	21	20	19	18	18	14	11	8	5	3	1	60
61	23	23	23	22	21	20	19	18	15	12	9	6	3	1	61
62	24	24	23	23	21	20	19	19	16	13	9	6	3	1	62

TABLE OF THE									
MOUNTAIN DISTRICT, 1860									
NAME	AGE	SEX	RELATION	EDUCATION	RELIGION	POLITICAL	PROFESSION	INDUSTRY	REMARKS
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310
311	312	313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328	329	330
331	332	333	334	335	336	337	338	339	340
341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380
381	382	383	384	385	386	387	388	389	390
391	392	393	394	395	396	397	398	399	400
401	402	403	404	405	406	407	408	409	410
411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430
431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470
471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490
491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510
511	512	513	514	515	516	517	518	519	520
521	522	523	524	525	526	527	528	529	530
531	532	533	534	535	536	537	538	539	540
541	542	543	544	545	546	547	548	549	550
551	552	553	554	555	556	557	558	559	560
561	562	563	564	565	566	567	568	569	570
571	572	573	574	575	576	577	578	579	580
581	582	583	584	585	586	587	588	589	590
591	592	593	594	595	596	597	598	599	600
601	602	603	604	605	606	607	608	609	610
611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630
631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650
651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670
671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690
691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710
711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730
731	732	733	734	735	736	737	738	739	740
741	742	743	744	745	746	747	748	749	750
751	752	753	754	755	756	757	758	759	760
761	762	763	764	765	766	767	768	769	770
771	772	773	774	775	776	777	778	779	780
781	782	783	784	785	786	787	788	789	790
791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810
811	812	813	814	815	816	817	818	819	820
821	822	823	824	825	826	827	828	829	830
831	832	833	834	835	836	837	838	839	840
841	842	843	844	845	846	847	848	849	850
851	852	853	854	855	856	857	858	859	860
861	862	863	864	865	866	867	868	869	870
871	872	873	874	875	876	877	878	879	880
881	882	883	884	885	886	887	888	889	890
891	892	893	894	895	896	897	898	899	900
901	902	903	904	905	906	907	908	909	910
911	912	913	914	915	916	917	918	919	920
921	922	923	924	925	926	927	928	929	930
931	932	933	934	935	936	937	938	939	940
941	942	943	944	945	946	947	948	949	950
951	952	953	954	955	956	957	958	959	960
961	962	963	964	965	966	967	968	969	970
971	972	973	974	975	976	977	978	979	980
981	982	983	984	985	986	987	988	989	990
991	992	993	994	995	996	997	998	999	1000

A P P L I C A T I O N

O F T H E P R E C E D I N G

T A B L E S.

S E C T I O N I.

Solution of four Cases of Oblique Spherics.

C A S E I.

G I V E N, the three sides of an oblique spherical triangle, and an angle required.

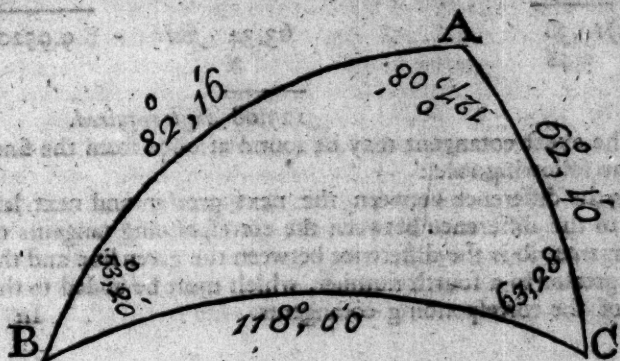
RULE 1. From the sum of the sides that contain the required angle, subtract the side opposite to it, and add half the remainder to the opposite side; then add together the half sines of the including sides and the half cosecants of the last sum and half remainder—the sum will be the secant of half the required angle.

RULE 2. Add the difference of the including sides to the opposite side, and take half the sum: Also, subtract the same difference from the opposite side, and take half the remainder; then add together the half sines of the half sum and half remainder and the half cosecants of the including sides—the sum will be the sine of half the required angle.

RULE 3. To the cosecant of half the side opposite to the required angle, add the sine of half the difference of the including sides—the sum will be the sine of an arch: To the cotangent of this arch add the half cosecants of the including sides, and the sine of half the difference of the including sides—the sum, lessened by 10 in the index, will be the sine of half the included angle.

E X A M P L E.

Let the sides that contain the required angle be $AB\ 82^{\circ}\ 16'$, and $AC\ 62^{\circ}\ 40'$, and the side opposite to the required angle be $BC\ 118^{\circ}\ 00'$, and let it be required to find the angle BAC .



By the first Rule.

82,16	} Including sides	82,16	half sine	4.99801
62,40		62,40	half sine	4.97429
144,56	sum - -	131,28	(48,32) b. cosecant	0.06272
118,00	opposite side -	13,28	half cosecant	0.31643
2)26,56		63,34	secant - -	10.35145
13,28	half remainder	2		
118,00				
		127, 8	Angle required,	
131,28	Sum,			

By the second Rule.

82,16	118,00	118,00
62,40	19,36	19,36
19,36	2)137,36	2)89,24
	68,48	49,12 b. rem.
68,48	half sine -	4.98478
49,12	half sine -	4.93955
82,16	half cosecant -	0.00198
62,40	half cosecant -	0.02571
63,34	sine -	9.95202
2		
127, 8	Angle required.	

By the third Rule.

2)118,00	59,00	cosec. 0.06693		
59,00	9,48	sine 9.23098	- -	9.23098
	11,27	sine 9.29791	correspon. cotang.	10.69335
82,16		82° 16'	half cosec.	0.00199
62,40		62 40	half cosec.	0.02571
2)19,36		63,34	sine -	9.95203
9,48		2		
		127,08	Angle required.	

The exact cotangent may be found at once from the sine, by the following rule :

As the difference between the next greater and next less sine, to the difference between the corresponding tangents or cotangents, so is the difference between the given sine and the next greater to a fourth number, which must be added to the least of the corresponding cotangents. In

In the same manner the angle $A \hat{C} B$, will be found to be $63^{\circ} 28'$, and the angle $A \hat{B} C$, $53^{\circ} 20'$.

CASE 2.

Given, the three angles of an oblique spherical triangle and a side required,

RULE. Consider the two less angles and the supplement of the greater angle as the sides of a new triangle, and find the angles of this triangle by either of the Rules given under Case 1. Those angles will be respectively the sides of the original triangle.

EXAMPLE.

Let the angles be $B \hat{A} C$ $127^{\circ} 08'$, $A \hat{C} B$ $63^{\circ} 28'$, and $A \hat{B} C$ $53^{\circ} 20'$, and let it be required to find the side $B C$ opposite to the angle $B \hat{A} C$ $127^{\circ} 08'$.

By the first Rule of the first Case,

180,00		54,26	} including sides. } in the new triangle.
127,08		63,28	
		52,52	
52,52	supplement		
53,20		53,20	half sine 4.95212
63,28		63,28	half sine 4.97583
		31,58	half cosecant 0.13810
116,48		84,50	half cosecant 0.00089
52,52			
		59,00	secant - 10.06694
2)63,56		2	
31,58	half remainder		
52,52		118,00	side B C required in the original triangle.
84,50	sum.		

In the same manner the side $B A$ will be found to be $82^{\circ} 16'$, and the side $A C$ $62^{\circ} 40'$.

CASE 3

Given two sides of an oblique spherical triangle, and the included angle, required the other side.

RULE 1. Add together the sine of half the included angle, and the half sines of the including sides—the sum, lessened by 10 in the index, will be the sine of an arch. Take the sum and difference of this arch, and half the difference of the sides; add together the half secants of this sum and difference—the sum will be the secant of half the required side.

RULE 2. Add together the cosecant of half the included angle, the half cosecants of the including sides, and the sine of half the difference of the sides—the sum will be the tangent of an angle, the cosecant of which being added to the sine of half the difference of the including sides—the sum will be the sine of half the required side.

EXAMPLE.

EXAMPLE.

Let the including sides be $BA\ 82^{\circ}16'$, and $AC\ 62^{\circ}40'$, and the included angle $BAC\ 127^{\circ}08'$, and let it be required to find the side BC .

By the first Rule.

2) 127,08

63.34

82,16
62,40

B) 19,36

8) 19,36

9,48 half difference of including sides

66-1

47,21

59,00

118.00

63,34

62,40

82,16

57,09

9.95202

4.97429

4.99801

9.92432

57,09

9,48

57,09

9,48

sum 66,57

47.21 difference

0.20361

0.08454

0.28815

By the second Rule.

63.34 cofecant - 0.04798

62.40 half cosecant 0.02571

82,16 half cosecant 0.00199

$9.48 \sin \theta = 9.23098$

—

1990

9.23098

0.70209

59,00 *sine*

9:93307

2

118.00 *side B C required.*

The exact cosecant may be found at once from the tangent, by the following rule:

As the difference between the next greater and next less tangent, to the difference between the corresponding cosecants (or sines) so is the difference between the given tangent and the next greater, to a fourth number which must be added to the least of the corresponding cosecants.

CASE 4

Given, two angles of an oblique spherical triangle and the included side; required the opposite angle

RULE.

RULE. Consider the included side (or its supplement if the side exceeds 90 degrees) as an angle, and the including angles as sides, and proceed by either of the rules given under the last Case; the result will be the supplement of the third angle, if neither of the given angles exceeds 90 degrees: But when one of the given angles exceeds 90 degrees, work with the supplement of it—the result will be the third angle required.

E X A M P L E.

Let the angles be $\angle C B 63^{\circ} 28'$, and $\angle A B C, 53^{\circ} 20'$, and the included side $B C, 118^{\circ} 00'$, and let it be required to find the opposite angle $B A C$.

180.00	31.00	<i>cosecant</i>	0.28816		
118.00	63.28	<i>half cosecant</i>	0.02417		
	53.20	<i>half cosecant</i>	0.03788		
2) 62.00	5.04	<i>sine</i>	8.94603	-	8.94603
31.00					
	11.27	<i>tangent</i>	9.30624	<i>correspon. cosec.</i>	0.70248
63.28					
53.20		26.26	<i>sine</i>		9.64851
		2	180.00		
2) 10.08			52.52		
5.04	-	<i>supplement</i>	52.52		
					127.08 <i>required angle.</i>

As the included side exceeded 90 degrees, the secant of its half might have been taken.

S E C T I O N II.

Of finding the Latitude.

THE Latitude is usually found from the altitude of a celestial object when on the meridian.

GENERAL RULE.

Subtract the correct altitude from 90 degrees, the remainder is the zenith distance, which is termed N. or S. accordingly as the zenith of the observer is north or south from the observed object. Now if the declination and zenith distance are of the same name, their sum will be the Latitude: If they are of contrary names, their difference will be the Latitude, which will be of the same name with the greater.

I. By a meridional observation of the Sun.

RULE. Subtract the dip of the horizon and the refraction from the observed altitude of the Sun's limb; to the remainder add the Sun's semidiameter, if the lower limb was observed; otherwise subtract it from the above remainder; to the result add the parallax in altitude—the sum will be the true

true meridional altitude of the Sun's centre; then by the supposed Longitude find the Greenwich time, corresponding to noon at the given place, and take out of the nautical almanack the declination for the noon preceding the reduced time, and also for the noon following it, and find their difference, of which take such a part as the odd hours, &c. in the reduced time are of 24 hours, and apply it by addition or subtraction to the first declination, accordingly as it is increasing or decreasing—the result will be the Sun's declination at the given place.

The altitude and declination being corrected, the Latitude is found by the general rule.

EXAMPLE.

February 1, 1791. Longitude 54° W. the meridional altitude of the Sun's lower limb was observed to be $59^{\circ}16'$

Altitude of the Sun's lower limb	-	-	-	$59^{\circ}16'$
Dip of the horizon, subtract	-	-	-	4.40

				$59,11,20$
Refraction answering to 59° , subtract	-	-	-	34

				$59,10,46$
Parallax in altitude, add	-	-	-	4

				$59,10,50$
Sun's semidiameter—N. A.	-	-	add	$16,16$

				$59,27,06$
True altitude of the Sun's centre	-	-	-	$90,00,00$

True zenith distance	-	-	-	$30,32,54$
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The Longitude 54° W. gives the reduced time at Greenwich, Feb. 1, $3^h 36^m$.

The declination for February 1, is	-	-	-	$17,01,10$ S
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The declination for February 2, is	-	-	-	$16,43,50$ S
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The difference is	-	-	-	$17,20$
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And as 24 to 336 so 17 20 to 2 36, which, as the declination is decreasing, must be subtracted from $17^{\circ} 1' 10''$, the declination for the noon preceding the reduced time; the remainder $16^{\circ} 58' 34''$ is the Sun's correct declination at noon at the given place. Here, as the zenith distance and declination are of contrary names, their difference is the Latitude.

Zenith distance	$30,32,54$ N
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Declination	$- 16,58,34$ S
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The Latitude is $13,34,20$, N, of the same name with the greater.

II. By

II. By a meridional observation of a Star.

RULE. Correct the observed altitude by subtracting from it the refraction and the dip, the remainder will be the true altitude, with which, and the declination taken of table XI, find the Latitude by the general rule.

EXAMPLE.

March 29, 1783: The meridional altitude of Procyon was observed to be $77^{\circ} 27\frac{1}{4}$, the zenith being south of the star, and the height of the observer's eye above the surface of the sea 22 feet, required the Latitude.

<i>Meridional altitude of Procyon</i>	-	-	77,27,15
<i>Refraction of 13", Dip 4' 28", subtract, sum</i>			4,41
<i>True altitude</i>	-	-	77,22,34
			90,00,00

<i>True zenith distance of Procyon</i>	-	-	12,37,26 S
<i>Declination from the table</i>	-	-	5,46,17 N

<i>Latitude is</i>	-	-	6,51, 9 S
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Note. When the Sun or a Star is observed on the meridian below the Pole, then correct its altitude by the preceding rules, and add to it the complement of the declination—the sum will be the Latitude of the same name with the declination.

III. By a meridional observation of the Moon.

RULE. Turn the Longitude of the given place into time, and add to it the number in table XII corresponding to that Longitude: Take the sum from the time of the Moon's southing for the given day (nautical almanack, p. 6) if the Longitude be east, but add it to the time of the southing if the Longitude be west; the result will be the time at Greenwich when the Moon was on the meridian of the given place; to which time take the Moon's horizontal parallax, and the semidiameter from p. 7 of the nautical almanack, and her declination from p. 6, observing to make proportion for 12 hours instead of 24.

From the observed altitude of the Moon's limb subtract the dip of the horizon, and add to the remainder the correction of the altitude taken out of table II, with the altitude of the limb corrected for the dip, to the same apply the Moon's semidiameter by addition or subtraction, accordingly as the lower or upper limb was observed; the result will be the true altitude of the Moon's centre, with which, and her correct declination, the Latitude is found by the general rule.

EXAMPLE.

EXAMPLE.

August 24, 1783: In Longitude 107° east, the meridional altitude of the Moon's upper limb was observed to be $67^{\circ} 42' 4''$, the zenith being north of the Moon, and the height of the observer's eye 23 feet above the surface of the sea, required the Latitude.

To $7^{\text{h}} 8^{\text{m}}$, the Longitude in time, add 14, the number corresponding to it in table XII, and take their sum $7^{\text{h}} 22^{\text{m}}$, from $22^{\text{h}} 11^{\text{m}}$, the time of the Moon's southing in the nautical almanack for the given day, the remainder is $14^{\text{h}} 49^{\text{m}}$ or $2^{\text{h}} 49^{\text{m}}$ past midnight, at which time the Moon's horizontal parallax was $54' 27''$, her semidiameter $14' 51''$, her declination $24^{\circ} 0' 1/2''$ N, and her correction from table II answering to her horizontal parallax and altitude corrected for the dip is $20' 20''$.

Meridional altitude of the Moon's upper limb	$67^{\circ} 42' 30''$
Dip of the horizon	$- \quad - \quad - \quad \text{subtract} \quad 4' 34''$
	$67^{\circ} 37' 56''$
Correction from table II	$- \quad - \quad - \quad \text{add} \quad 20' 20''$
	$67^{\circ} 58' 16''$
Moon's semidiameter by N. A.	$\text{subtract} \quad 14' 51''$
True altitude of the Moon's centre	$67^{\circ} 43' 25''$
	$90,00,00$
True zenith distance	$22,16,35 \text{ N}$
Moon's declination	$24,00,30 \text{ N}$
Latitude	$46,17,05 \text{ N}$

When a meridional observation of the Sun cannot be taken, the Latitude may frequently be found by taking two altitudes, the time elapsed between the observations being measured by a common watch; the rules and tables for finding the Latitude by this method are contained in almost all the late treatises on Navigation, but the following cautions deserve attention, for in some situations the results of successive operations will be wider and wider from the truth.

I. The observations must always be taken between nine o'clock in the morning and three in the afternoon, and the nearer the greater altitude is to noon the better.

II. If both observations are in the forenoon, the interval must not be much less than half the distance of the first observation from noon.

III. If both observations are in the afternoon, the interval between them must not be much less than the distance of the first observation from noon.

IV.

IV. If one observation be in the forenoon, and the other in the afternoon, the interval must not exceed four hours and a half.

V. The above limitations are founded on a supposition that the Sun's meridional zenith distance is not less than the Latitude of the place; but if the Latitude of the place should be double the Sun's meridional zenith distance, the first of the two altitudes taken in the forenoon must not be before half past nine, nor the second before three quarters past ten. The first of two taken in the afternoon must not be later than a quarter past one, nor the second after half past two. If one be taken in the morning and the other in the afternoon; that in the morning must not be taken before half past nine o'clock, and the interval between them must not exceed three hours and a half.

VI. If the Latitude of the place be three times the Sun's meridional zenith distance, the first of two observations taken in the forenoon must not be before ten o'clock, nor the second before eleven. The first of the two taken in the afternoon must not be later than one o'clock, nor the second after two. If one observation be taken in the forenoon and the other in the afternoon; that in the morning must not be before ten, and the interval between them must not exceed three hours.

VII. If the Latitude be five times the Sun's meridional zenith distance, the first of two observations taken in the forenoon must not be before half past ten o'clock, nor the second before a quarter after eleven. The first of two taken in the afternoon must not be later than three quarters past twelve, nor the second later than half past one o'clock. If one be taken in the forenoon and the other in the afternoon; the morning one must not be before half past ten, and the interval between them must not exceed two hours and a quarter.

VIII. If the Latitude be twelve times the Sun's meridional zenith distance, the first of two observations taken in the forenoon must not be before eleven o'clock, nor the latter before half past eleven. The first of two taken in the afternoon must not be after half past twelve, nor the latter after one o'clock. If one be in the forenoon and the other in the afternoon, the morning one must not be before eleven o'clock, and the interval between them not more than an hour and a half.

SECTION

SECTION III.

Of finding the apparent Time.

THE apparent time is deduced directly from the meridional distance of the Sun, or derived by means of the tables of right ascension from the meridional distance of any known celestial object.

PROBLEM. Given, the Latitude of a place with the declination and altitude of a celestial object, to find the meridional distance.

GENERAL RULES.

1. Subtract the corrected altitude from 90 degrees, the remainder is the true zenith distance. Subtract also the Latitude from 90 degrees, the remainder is the colatitude, and subtract the declination of the object from 90 degrees, if it is of the same name with the Latitude, otherwise add it to 90 degrees—the result will be the polar distance.

2. From the sum of the Latitude and polar distance subtract the zenith distance, and add half the remainder to the zenith distance, noting the last sum and half remainder.

3. Add together the half sines of the colatitude and polar distance, and the half cosecants of the last sum and half remainder—the sum will be the secant of an angle, the double of which is the distance of the object from the meridian.

I. *By an observed altitude of the Sun.*

RULE. From the observed altitude subtract the dip of the horizon and the refraction, and to the remainder add the Sun's semidiameter—the result will be the true altitude of the Sun's centre; to find the correct declination follow the directions given in the second Section, and then apply the general rule; the Sun's distance from the meridian converted into hours, &c. will give the apparent time from the nearest noon: Consequently, if the observation was made in the forenoon, the time thus found must be taken from 24 hours to give the time from the noon of the preceding day.

EXAMPLE.

In Latitude $39^{\circ} 54' N.$ and Longitude by account $35^{\circ} 30' W.$ of Greenwich on the 7th of May, 1786, at $5^h 30^m$ P. M. by watch, the altitude of the Sun's lower limb was found by observation to be $15^{\circ} 45'$, the eye being elevated 18 feet above the sea; required, the apparent time when this observation was made.

Time by watch	-	^h 5, ^m 30	Sun's decl. May 7 at noon	^h 16, ^m 56, ^s 10
Long. by acc. $35^{\circ} 30' W$		2, 22	May 8 at noon	- 17, 12, 28
Supp. time at Greenwich, by watch,	}		7, 52	Daily increase - 16, 18

As

As 24° to $7^{\circ} 52'$ to $16^{\circ} 18'$ to $3^{\circ} 20'$ add $16,56,10$
 $5,20$

Sun's declination at the time and place of observation $17, 1,30$
 $90,00,00$
 $17, 1,30$

$72,58,30$ polar distance

Observed altitude of the Sun's lower limb $15,45,00$

Dip for 18 feet $4,03$

Refraction $15,40,57$
 $3,21$

Sun's semidiameter $15,37,36$
 $15,53$

Sun's true altitude $15,53,29$
 $90,00,00$
 $15,53,29$

$74,06,31$ Sun's zenith distance $90,00$

Latitude $39,54$

Colatitude $50,06$

Colatitude $50,06,00$ $50,06,00$ half sine $4,94244$

Polar distance $72,58,30$ $72,58,30$ half sine $4,99027$

$98,34,31$ half cosecant $0,00745$

$123,04,30$ $24,29,00$ half cosecant $0,19128$

Zen. distance $74,06,31$ $41,38,00$ secant $0,12644$

$2)48,57,59$ 2

H. remaind. $24,29,00$ $83,16,00$ Sun's distance from the me-
 $74,06,31$ ridian or horary angle, an-

Sum $98,35,31$ $5^{\circ} 33' 04''$ the true time the obs. was made.

II. By an observed altitude of a Star.

RULE. Subtract the refraction and the dip of the horizon from the observed altitude of the Star, the remainder will be its true altitude, with which and its declination and the colatitude, find by the general rule its distance from the meridian; whence by means of the Star's and Sun's right ascensions the Sun's distance from the meridian or the apparent time, is found as follows: Turn the meridian distance into time and apply it to the star's right ascension by addition or subtraction, according

according as the star is west or east of the meridian—the result will be the right ascension of the midheaven: From the right ascension of the midheaven (increased by 24 hours if necessary) subtract the Sun's right ascension for the preceding noon at Greenwich, taken from p. 2 of the nautical almanack, the remainder is the estimated time at the ship, which, being corrected for the Longitude, will give the apparent time nearly by the meridian of Greenwich. Take next such a part of the daily variation of the Sun's right ascension as the reduced time is of 24 hours, and subtract it from the estimated time—the remainder will be the correct apparent time at the ship.

EXAMPLE.

May 18, 1786: In Latitude $33^{\circ}43' N$. Longitude $45^{\circ} W$. the altitude of Lyra when east of the meridian was observed to be $36^{\circ}03'$, the height of the eye above the sea being 16 feet, required the apparent time when this observation was made.

Altitude of Lyra	$36^{\circ} 3' 0''$	Ship's Latitude	$33,43 N$
Dip for 16 feet	$3,49$		
Refraction	$1,18$	Colatitude	$56,17$
True altitude	$35,57,53$		
	$90,00,00$	Lyra's declination	$38,35,27 N$
Zenith distance	$54, 2, 07$	Polar distance	$51,24,33$
Colatitude	$56,17,00$	$56,17,00$ half sine	$4,96001$
Polar distance	$51,24,33$	$51,24,33$ half sine	$4,94650$
Zenith distance	$107,41,33$	$80,51,50$ half cosecant	$0,00277$
	$54, 2, 07$	$26,49,43$ half cosecant	$0,17275$
	$2)53,39,26$	$34, 7, 6$ secant	$0,08203$
Half remainder	$26,49,43$		
	$34, 2, 07$	$68,14,12$ Sun's dist. E. fr. mer.	
Sum	$80,51,50$	in time $4^h 32^m 57^s$	
From Lyra's right ascension	-	-	$18,29,41$
Subtract meridional distance east	-	-	$4,32,57$
Remains right ascension of midheaven	-	-	$13,56,44$
Subtract Sun's right ascension, May 18, at noon	-	-	$3,41,19$
Estimated time at the ship	-	-	$10,15,25$
Add the ship's Longitude west 45° in time	-	-	$3,00,00$
Apparent time at Greenwich nearly	-	-	$13,15,25$
			Sun's

Sun's right ascension, May 18, at noon is	3 47 19
Sun's right ascension, May 19, at noon is	3 45 18
Daily increase of right ascension	3 59

As 24° to $13^{\circ} 15' 25''$, so $3^{\circ} 59'$ to $2^{\circ} 12'$, which being subtracted from the estimated time at the ship $10^{\circ} 15' 25''$, the remainder is $10^{\circ} 13' 13''$, the true time at the ship when the observation was taken.—*Note.* The Star's right ascension and declination from table XI, are corrected for the given year.

SECTION IV.

Of reducing the apparent distance of the Moon from the Sun or a fixed Star, to the true distance.

1. **T**O find the apparent distance of the Moon's centre from a Star, apply the Moon's true semidiameter by addition or subtraction to the observed distance, accordingly as the limb nearest to the star or farthest from it was observed.

2. To find the apparent distance of the moon's centre from the Sun's centre, if the nearest limbs were observed, add the moon's true semidiameter and the Sun's semidiameter to the observed distance. If the moon's nearest and the Sun's farthest limb were observed, then add the Moon's true semidiameter to the observed distance and subtract the Sun's. If the farthest limbs were observed, then subtract the sum of the Sun's and Moon's semidiameters from the observed distance.

3. To find the apparent altitude of a Star, subtract the dip of the horizon from the observed altitude.

4. To find the true altitude of a Star from the apparent altitude, subtract the refraction.

5. To find the apparent altitude of the Sun's centre from the observed altitude, subtract the dip, and to the remainder apply by addition or subtraction the Sun's semidiameter, accordingly as the lower or upper limb was observed.

6. To find the true altitude of the Sun's center from the apparent altitude, subtract the refraction, and to the remainder add the parallax.

7. To find the apparent altitude of the Moon's centre from the observed altitude, subtract the dip, and to the remainder apply the Moon's true semidiameter by addition or subtraction, accordingly as the Moon's lower or upper limb was observed.

8. To find the true altitude of the Moon's centre; to the apparent altitude add the correction in table II answering to that altitude and to the given horizontal parallax.

Note. By apparent and true altitudes and distances, are usually meant the apparent and true altitudes and distances of the centres, when the objects have any sensible semidiameter.

PROBLEM

PROBLEM. Given, the Moon's apparent altitude, horizontal parallax and apparent distance from a fixed celestial object, together with the apparent altitude of that object, to find the true distance.

METHOD I.

RULE 1. Reduce the Moon's apparent altitude to the true altitude by means of the corrections in table II, and at the same time take out the logarithm corresponding to the apparent altitude and given horizontal parallax, which logarithm must be reserved.

RULE 2. To the apparent distance add the difference of the apparent altitudes, and take half the sum also; from the apparent distance, subtract the difference of the apparent altitudes and take half the remainder.

RULE 3. Add together the reserved logarithms and the half cosecants of the half sum and half remainder—the sum will be the cosecant of an arc.

RULE 4. Take the sum and difference of this arc, and half the difference of the true altitudes, and add together the half secants of this sum and difference—the sum will be the secant of half the true distance.

METHOD II.

Follow the first method as far as Rule 3; add together the reserved logarithm, the half cosecants of the half sum and half remainder, and the sine of half the difference of the true altitudes—the sum will be the tangent of an arc, the corresponding cosecant of which added to the above mentioned sine of half the difference of the true altitudes, will give the sine of half the true distance.

EXAMPLE. I.

Moon's apparent altitude $12^{\circ} 30'$, horizontal parallax $56' 15''$, Star's apparent altitude $24^{\circ} 48'$ apparent distance $51^{\circ} 28' 35''$, required the true distance.

First method.

12,30,00
50,42 Corrections from table II, added, reserved logarithm 68.

13,20,42 Moon's true altitude

24,48,00	0' 15"
2,03 refraction subtracted	24,45,57
	13,20,42

24,45,57 Star's true altitude 2) 11,25,15

5,42,38 half difference of true altitudes.

24° 48'
12, 30

12, 18 difference of apparent altitudes

51, 28, 35 apparent distance 51, 28, 35
12, 18, 00 diff. of appar. altitudes 12, 18, 00

2) 63, 46, 35 2) 39, 10, 35

31, 53, 18 half sum 19, 35, 17 half remain.

Half sum 31, 53, 18 half cosecant 0.13858 24, 50, 46
Half remain. 19, 35, 17 half cosecant 0.23731 5, 42, 38

Reserved logarithm 67

24° 50' 46" cosecant 0.37656 30, 33, 24 sum

24, 50, 46
5, 42, 38

19, 08, 08 diff.

Sum 30, 33, 24 half secant 0.03246
Difference 19, 08, 08 half secant 0.01235

25, 34, 56 secant 0.04481

2

51, 9, 52 true distance

Second Method.

Reserved log. 67

Half sum 31, 53, 18 h. cosec. 0.13858
Half remain. 19, 35, 17 h. cosec. 0.23731
H. diff. tr. alt. 5, 42, 38 sine 8.99783 8.99783

13, 19 tangent 9.37439 corr. cosec. 0.63745

25, 34, 56 sine 9.63528

2

51, 9, 52 true distance

When it is required to find the true distance to the utmost exactness, the separated figures must be annexed to the logarithms taken from tables I and II, and the last increased by the numbers contained in tables III and IV, as in the following example.

D d

EXAMPLE.

EXAMPLE 2.

Sun's apparent altitude $19^{\circ} 3' 36''$, Moon's apparent altitude $41^{\circ} 6' 2''$, horizontal parallax $58' 35''$, apparent distance $103^{\circ} 29' 27''$, required the true distance.

First Method.

$$\begin{array}{r} \circ \quad \overset{\circ}{1} \quad \overset{''}{''} \\ 41, \quad 6, \quad 2 \\ \hline 43,03 \text{ Corr. from table II} \end{array}$$

41,49, 5 Moon's true altitude

$$\begin{array}{r} \text{Logarithm from table II} \quad 233,95 \\ \text{Add logarithm from table III} \quad ,35 \\ \hline \end{array}$$

$$\text{Reserved logarithm} \quad - \quad 234,30$$

$$\begin{array}{r} \circ \quad \overset{\circ}{1} \quad \overset{''}{''} \\ 41, \quad 6, \quad 2 \\ \hline 19,3,36 \end{array}$$

$$\begin{array}{r} \text{Sun's apparent altitude} \quad 19,3,36 \\ \text{Refraction} \quad - \quad 2,44 \\ \hline \end{array}$$

22,2,26 difference of apparent altitudes

$$\begin{array}{r} 19,0,52 \\ \text{Parallax} \quad - \quad 8 \\ \hline \end{array}$$

Sun's true altitude $19,1,00$

$$\begin{array}{r} \circ \quad \overset{\circ}{1} \quad \overset{''}{''} \\ 41,49,5 \\ \hline 19, \quad 1,0 \end{array}$$

$$2)22,48,5$$

11,24,2 half difference of true altitudes

$$\begin{array}{r} \circ \quad \overset{\circ}{1} \quad \overset{''}{''} \\ 103,29,27 \text{ apparent distance} \quad 103,29,27 \\ \hline 22, \quad 2,26 \text{ diff. of app. alts.} \quad 22, \quad 2,26 \end{array}$$

$$2)125,31,53$$

62,45,56 half sum

$$2)81,27,01$$

40,43,30 half remainder

$$b. \text{ sum } 62,45,56 \quad b. \text{ cosec. } 0.0255145$$

$$\begin{array}{r} \circ \quad \overset{\circ}{1} \quad \overset{''}{''} \\ 49,14,54 \end{array}$$

$$\begin{array}{r} \circ \quad \overset{\circ}{1} \quad \overset{''}{''} \\ 49,14,54 \end{array}$$

$$b. \text{ rem. } 40,43,30 \quad b. \text{ cosec. } 0.0927333$$

$$\begin{array}{r} \circ \quad \overset{\circ}{1} \quad \overset{''}{''} \\ 11,24, \quad 2 \end{array}$$

$$\begin{array}{r} \circ \quad \overset{\circ}{1} \quad \overset{''}{''} \\ 11,24, \quad 2 \end{array}$$

Reserved logarithm

$$23430$$

$$\begin{array}{r} 60,38,56 \end{array}$$

$$\begin{array}{r} 37,50,52 \end{array}$$

$$49^{\circ} 14' 54'' \text{ cosec. } 0.1205908$$

$$\text{Sum} \quad 60,38,56 \text{ half secant } 0.1548283$$

$$\text{Difference } 37,50,52 \text{ half secant } 0.0512830$$

$$51,31,39 \text{ secant } 0.2061113$$

2

103, 3,18 true distance

Second

Second Method.

Reserved log.	0 1 "	23430	
half sum	62,45,56	b. cosec.	0.0255145
half remainder	40,43,30	b. cosec.	9.0927333
b. diff. of tr. alt.	11,24, 2	sine	9.2959338
			9.2959338
14,37	tangent	9.4165246	cor. cosec. 0.5977782
		0 1 "	
		51,31,39	sine 9.8937120
		2	2
		103, 3,18	true distance.

EXAMPLE 3.

Sun's apparent altitude $32^{\circ} 00'$, Moon's apparent altitude, $24^{\circ} 00'$, horizontal parallax, $58' 39''$, apparent distance, $68^{\circ} 42'$, required, the true distance. *Answer*, $68^{\circ} 19' 28''$.

EXAMPLE 4.

Moon's apparent altitude, $55^{\circ} 39'$, horizontal parallax, $56' 58''$, Star's apparent altitude, $71^{\circ} 04'$, apparent distance, $62^{\circ} 41'$, required, the true distance. *Answer*, $62^{\circ} 13' 57''$.

EXAMPLE 5.

Moon's apparent altitude, $27^{\circ} 30'$, horizontal parallax $57' 3'$, Star's apparent altitude, $15^{\circ} 25'$, apparent distance, $102^{\circ} 30'$. The true distance is $102^{\circ} 12' 55''$.

The two methods applied in this section are grounded upon the following.

In the spherical triangle, formed by the apparent distances of the objects from the zenith and from each other, find by the first case of the first section, the angle contained by the zenith distances; with this angle and the true zenith distances, find the true distance by the third case of the first section.

Note. When the true distance is found, the corresponding time by the meridian of Greenwich is thus found:

Among the distances of the Moon's centre from the Sun and fixed Stars, in the 8th, 9th, 10th and 11th pages of the nautical almanack, find those two distances of the Sun and Moon which are next less and next greater than the true distance, take the difference between them, also between that which stands first in the ephemeris, and the true computed distance, and subtract the proportional logarithm of the former difference from the proportional logarithm of the latter; the remainder will be the proportional logarithm of a portion of time, to be added to the time for which the distance standing first in the ephemeris was computed, and the sum will be the apparent time at Greenwich.

SECTION

S E C T I O N V.

Of finding the longitude by an observation of the Moon's distance from a fixed Celestial Object.

SINCE all celestial appearances answer nearly to the same point of absolute time in all parts of the earth; the difference of the longitude of two places is deduced from the difference of the relative times of those appearances.

G E N E R A L R U L E.

Find the apparent and true altitudes, and the apparent distance by the directions given in section fourth, and thence find the true distance by either of the methods contained in that section.

Find by the note at the end of section fourth, the apparent time by the meridian of Greenwich, answering to this true distance.

Find by section third, the apparent time at the ship, answering to the true distance.

Then the difference between the ship's time and Greenwich time, converted into degrees and minutes, will be the ship's longitude; and it is east or west accordingly as the ship's time or Greenwich time is greater.

Note. The apparent time at the ship may be found from the altitude of the object taken at the same time with its distance from the moon: Or the observation for finding the apparent time may be taken within a few hours of that for the distance, and the watch regulated accordingly.

I. Having the latitude of a ship, and its longitude by account, also the observed distance of the Sun and Moon, together with their observed altitudes, the longitude is found thus:

1. Reduce the supposed longitude to time, and apply it to the estimated time at the ship by addition, or subtraction, accordingly as it is west or east—the result will be the time at Greenwich, nearly.

2. Find the Moon's horizontal semidiameter and horizontal parallax for this time as follows: Take from the nautical almanack the Moon's semidiameter and horizontal parallax for the noon or midnight preceding, also for the noon or midnight following the reduced time, then say, as 12 to the difference between the reduced time and the next preceding noon or midnight, so is the variation of the semidiameter in 12^a to a fourth proportional, and so is the variation of the horizontal parallax in 12^a to a fourth proportional; these fourth proportionals being applied respectively to the semidiameter and horizontal parallax for the preceding noon or midnight,

midnight, by addition or subtraction, accordingly as they are increasing or decreasing, will give the Moon's horizontal semidiameter and horizontal parallax, for the reduced time.

3. Find the Moon's true semidiameter at the time and place of observation by adding to her semidiameter the number of seconds found in table IX, corresponding to her observed altitude, also, take the Sun's semidiameter out of the nautical almanack. The true semidiameters of the Sun and Moon being found, the ship's longitude is found by the general rule.

Note. When the apparent time at the ship is found by an observation of the Sun's altitude taken at the same time with its distance from the Moon, then the true time at Greenwich being first found, the Sun's declination should be corrected for that time.

EXAMPLE.

April 4, 1786, about three quarters past four o'clock P. M. in Latitude $34^{\circ} 17' N$. Longitude by account $17^{\circ} 46' W$. the following observations were taken, the height of the observer's eye being 18 feet.

Altitude of the Sun's lower limb.	Altitude of the Moon's lower limb.	Distance of the nearest limbs.
22,51	80,18	77,55, 0
22,12	80,36	77,57, 0
21, 6	81,09	78, 2,10
3)66,09	242,03	233,54,10
22,03	80,41	77,58, 3

Estimated time at the ship $4^h 45^m 00^s$
Long. in time $17^{\circ} 46' W$. $1^h 11^m 4^s$

Reduced time $5^h 56^m 4^s$

For the Moon's true semidiameter and horizontal parallax.

Moon's semidiam. at noon	15,57	Hor. par. at noon	58,31
Moon's semi. at midnight	15,49	Hor. par. at midnight	58,03

Difference in 12 hours 8 Diff. in 12 hours 0,28

As 12^h to $5^h 56^m 4^s$ so $8''$ to $4''$. As 12^h to $5^h 56^m 4^s$ so $28''$ to $14''$.

Moon's semidiam. at noon	15,57	From hor. par. at noon	58,31
subtract	4	subtract	14

Hor. semi. at reduced time 15,53 Hor. par. at red. time 58,17
Augmentation table IX 16

Moon's true semidiam. 16, 9

For

For apparent and true altitudes, and apparent distance.

Observed altitude of the Sun's lower limb 22,03
Dip for 18 feet - - - - - 4,03

Semidiameter - - - - - add 16, 1

Sun's apparent altitude - - - - - 22,14,58
Refraction - - - - - subtract 2,20

Parallax - - - - - add 8

Sun's true altitude - - - - - 22,12,46

Observed altitude of the Moon's lower limb 80,41

Dip for 18 feet - - - - - 4,03

True semidiameter - - - - - add 16,09

Moon's apparent altitude - - - - - 80,53,06
Correction from table II - - - - - add 9, 4

Moon's true altitude - - - - - 81, 2,10

Observed distance of the nearest limbs 77,58,03

Sum of Sun's and Moon's semidiameters, add 32,10

Apparent distance - - - - - 78,30,13

For the true Distance by the second Method of Section IV.

Moon's apparent altitude 80,53, 6 App. distance 78,30,13

Sun's apparent altitude 22,14,58 Diff. of app. alt. 58,38, 8

Difference - - - - - 58,38, 8

Apparent distance 78,30,13 Half remainder 9,56, 2

Half sum - - - - - 68,34,10

Half sum - - - - - 68,34,10

Refer. log. - - - - - 354

H. sum 68,34,10 h. cosec. 0.01556 H. diff. of tr. alt. 29,24,42

H. rem. 9,56, 2 h. cosec. 0.38159

H. d. of t. al. 29,24,42 sine 9.69115

51° 1' tangent 10.09184 cosecant 0.10942

39° 10' 55" sine 9.80057

2

78, 21, 50 true distance.

For

For True Time at Greenwich.

Dist. at 3 ^h (nautical almanack)	^o 11' ^u 77,11,11	^o 11' ^u 77,11,11
Distance at 6 ^h	^o 45' ^u 78,45,50 comp. dist.	^o 45' ^u 78,21,50

Differences	1,34,39	1,10,39
-------------	---------	---------

^o 11' ^u 1,10,39	Proportional logarithm 4062
---------------------------------------	-----------------------------

^o 45' ^u 1,34,39	Proportional logarithm 2799
---------------------------------------	-----------------------------

^h 5 ^m ^u 2,14,34	P. logar. 1263
--	----------------

add	^o 30' ^u 3,00,00
-----	---------------------------------------

Time at Greenwich 5,14,34

For the True Time at the Ship.

Sun's decl. Apr. 4	^o 51' ^u 59 N.	As ^h 24 ^m to ^h 5,14,34	so ^o 22,46 to ^o 4,58.
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Sun's decl. Apr. 5	^o 6,14,45
--------------------	----------------------

Diff. in 24 hours	22,46
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To	^o 51' ^u 59
add	^o 4,58

Sun's decl. April 4 th at 5 ^h 14 ^m 34 ^s P. M.	-	^o 55,56,57
---	---	-----------------------

^o 90,00,00	^o 84, 3,03	^o 84, 3,03	<i>b. sine</i>	4.95856
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^o 55,56,57	^o N. decl. 55,43,00	^o 55,43,00	<i>b. sine</i>	4.99883
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^o 103,46,38	^o h. cofec. 0.00633
------------------------	--------------------------------

^o 84, 3,03	^o Pol. dist. 139,46,03	^o 35,59,24	<i>b. cofec.</i>	0.11544
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^o 67,47,14	^o 33,33,13	<i>secant</i>	0.07916
-----------------------	-----------------------	---------------	---------

^o 90,00,00	^o 22,12,46	^o S ^{ns} alt. 2) 71,58,49	^o 2
-----------------------	-----------------------	---	----------------

^o 67,47,14	^o zen. dist. 35,59,24	^o 67, 6,26	{ hour ang. of ship's time 4 ^h 28 ^m 26 ^s .
-----------------------	----------------------------------	-----------------------	--

^o 67,47,14	^o 34,17 N.	^o 103,46,38
-----------------------	-----------------------	------------------------

^o 90,00	^o 34,17 N.	^o 103,46,38
--------------------	-----------------------	------------------------

^o 55,43	^o colatitude
--------------------	-------------------------

^h 5 ^m ^u 5,14,34	Greenwich time
--	----------------

^h 4 ^m ^u 4,28,26	Ship's time
--	-------------

^o 46,08	Difference is
--------------------	---------------

^o 11 ^o 32'	answering to
----------------------------------	--------------

^o 11 ^o 32'	which is the ship's Longitude from Greenwich, and is west
----------------------------------	---

^o 11 ^o 32'	because the time at Greenwich is greater.
----------------------------------	---

^o 11 ^o 32'	II.
----------------------------------	-----

II. Having the Latitude of a ship and its Longitude by account, also the observed distance of the Moon from a fixed Star, together with their observed altitudes, the Longitude is found thus :

Reduce the estimated time at the ship to Greenwich time, and find, by the directions given in this section, the Moon's true semidiameter, and horizontal parallax, for the reduced time; and thence find the Longitude by the general rule.

EXAMPLE.

June 12, 1775, about half past nine, P. M. in Latitude $2^{\circ} 26' N$. Longitude by account $32^{\circ} W$. the distances of the Moon's remote limb from the Star Altair, and the altitudes of the Star and of the Moon's upper limb, were observed as follows ; the height of the observer's eye being 21 feet :

Estimated time at the ship $9,30,00$
Longitude in time west $2, 8$

Time at Greenwich nearly $11,38,00$

Moon's hor. par. (page 7 N. A.) $60', 05''$
Moon's semidiameter $16, 23$
Augmentation table IX 13

Moon's augmented semidiameter $16, 36$

Altitudes of the Star.	Alt. of the M ^s sup. limb.	Dist. of the Moon & Star	
$18,30$	$55,24$	$50,26, 0$	
$18,40\frac{1}{2}$	$55,47$	$26,15$	
$19,15$	$56, 6$	$25,45$	
$19,37$	$56,27$	$24,45$	
$19,55$	$56,46$	$24,30$	
$20,17\frac{1}{2}$	$57, 5$	$24,30$	
6 $116,15$	$337,35$	$151,45$	Sum to be divided by 6.
$19,22,30$	$56,15,50$	$50,25, 7\frac{1}{2}$	Means
$0, 0$	add 45	$0 0$	Errors of quadrants
$4,22$	$4,22$		Subt. dip of horizon
	$16,36$	$16,36$	M ^s semidiam. subt.
$19,18, 8$	$55,55,37$	$50, 8,41$	App. dist. & alts.

Star's apparent alt. $19,18, 8$ Moon's app. altitude $55,55,37$
Refraction $- 2,41$ Corr. from table II. $33, 2$

Star's true altitude $19,15,27$ Moon's true altitude $56,28,39$
For

For the true Distance, by Method I, Section IV.

55,55,37	50, 8,41	Apparent distance	50, 8,41
19,18, 8	36,37,29	Diff. of app. altitudes	36,37,29
36,37,29	2)86,46,10		2)13,31,12
Half sum	43,23, 5	Half remainder	6,45,31
Logarithm from table II	30565		
Add logarithm from table IV	05		
Reserved logarithm	30570		
43,23, 5 half cosecant	0.0815386	Moon's tr. altitude	56,28,39
6,45,36 half cosecant	0.4647339	Star's tr. altitude	19,15,27
Reserved logarithm	30570		
			2)37,13,12
16° 23' 45" secant	0.5493295	Half difference	18,36,36
18,36,36			
16,23,45			
35,00,21	Sum	2,12,51	Difference
35,00,21 half secant	0.0433442		
2,12,51 half secant	0.0001637		
25,13,14	secant	0.0435079	
2			
50,26,28	True distance.		

For Greenwich time.

Distance at 9 hours	51,44,54		51,44,54
Distance at 12 hours	50,16,00	Computed distance	50,26,28
Difference	1,28,54		1,18,26
1,18,26	Proportional logarithm	3608	
1,28,54	Proportional logarithm	3064	
	2,38,48	P. log.	544
add	9,00,00		
Time at Greenwich	11,38,48		

For true time at the Ship.

90,00		81,42
8,18 N. Star's declination table XI		87,34
81,42 Polar distance		169,16
90,00		70,45
19,15 Star's true altitude		2)98,31
70,45 Zenith distance		49,15½ b. remaind.
90,00		70,45
2,26 N. Latitude		120,00½ Sum
87,34 Colatitude		
87,34 half sine	4.9998041	
81,42 half sine	4.9977135	
120,00½ half cossec.	0.0312579	
49,15½ half cossec.	0.0602629	
35,26,56 secant	0.0890384	

70,53,52 Star's distance east from the meridian, in time 4^m 43^s 35^t.

Star's right ascension table XI	-	19,39,50
Star east of the meridian	subtract	4,43,35

Right ascension of midheaven	-	14,56,15
Sun's right ascension for noon at Greenwich		5,21,46

Estimated time	-	9,34,29
Add Ship's Longitude, 32° W. in time		2, 8,00

Apparent time at Greenwich, nearly	-	11,42,29
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As 24^h to 11^h 42^m 29^s, so are 4^m 9^s, the daily variation of the Sun's right ascension to 2^m 1^s, which being subtracted from 9^m 34^m 29^s, the remainder 9^m 32^m 28^s is the apparent time at the ship when the observation was taken.

Apparent time at Greenwich	11,38,48
Apparent time at the ship	- 9,32,28

Difference or longitude in time	2, 6,20	{ answering to 31° 35' W. because the Greenwich time is greatest.
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SECTION

SECTION VI.

Mr. Lyons's method of reducing the Moon's Apparent Distance from a fixed Celestial Object to the True Distance.

THE correction of the apparent altitude of a fixed Star is its refraction; but the correction of the apparent altitude of the Sun, is the difference between its refraction and parallax in altitude: The correction of the Moon's apparent altitude is contained in table II.

RULE 1. To the proportional logarithm of the correction of the object's apparent altitude add the cosine of its apparent altitude, the sine of the apparent distance and the cosecant of the Moon's apparent altitude—the sum, lessened by 20 in the index, will be the proportional logarithm of the first arc.

RULE 2. To the proportional logarithm of the correction of the object's apparent altitude add the cotangent of its apparent altitude, and the tangent of the apparent distance—the sum, lessened by 20 in the index, will be the proportional logarithm of the second arc.

RULE 3. If the apparent distance be greater than 90 degrees, add to it the sum of the two arcs; but if the apparent distance be less than 90 degrees, apply to it the difference between the first and second arcs, by addition, if the first arc be greater than the second, otherwise by subtraction.

RULE 4. Add together the proportional logarithm of the correction of the Moon's apparent altitude, the cosine of the Moon's apparent altitude, the sine of the distance once corrected, and the cosecant of the object's true altitude—the sum, lessened by 20 in the index, will be the proportional logarithm of a third arc.

RULE 5. Add together the proportional logarithm of the correction of the moon's apparent altitude, the cotangent of the Moon's apparent altitude, and the tangent of the distance once corrected—the sum, lessened by 20 in the index, will be the proportional logarithm of a fourth arc.

RULE 6. If the distance once corrected be greater than 90 degrees, subtract the sum of the third and fourth arcs from it; but if the distance once corrected be less than 90 degrees, apply to it the difference between the third and fourth arcs by subtraction, if the third arc be greater than the fourth, otherwise by addition.

RULE 7. Enter table XIV with the apparent distance twice corrected in the top column, and with the correction of the moon's apparent altitude in the side column, and take out the number of seconds which stands under the former and opposite to the latter: Also, find the second correction of

the distance in the side column, and take out the number of seconds which stands against it under the distance twice corrected; then, if the distance twice corrected be less than 90 degrees the difference of these numbers must be added to it, if otherwise, subtracted from it—the result will be the true distance of the objects.

EXAMPLE 1.

Moon's apparent altitude $12^{\circ}30'$, horizontal parallax $56'15''$, star's apparent altitude $24^{\circ}48'$, apparent distance $51^{\circ}28'35''$, required, the true distance.

Star's apparent altitude	$24,48''$		
Refraction	-	$2,3$	
Star's true altitude	$24,45,57$		
Star's refrac.	$2,3$	Pro. log.	1.9435
Star's app. alt.	$24,48$	cosine	9.9580
App. distance,	$51,29$	sine	9.8934
M's app. alt.	$12,30$	cosec	0.6647
			$2d \text{ arc } 0^{\circ}45''\frac{1}{2}$
First arc	$0,37\frac{1}{2}$	Prop. L.	2.4596
Second arc	$0,45\frac{1}{2}$	From apparent distance	$- 51,28,35$
Difference	8	Subtract first correction	$- 8$
		Distance once corrected	$51,28,27$
Corr. of M's app. alt.	$50'42''$	Pr. log.	0.5502
Moon's app. alt.	$12^{\circ}30'$	cosine	9.9896
Dist. once corrected	$51,28$	sine	9.8933
Star's true altitude	$24,46$	cosec.	0.3779
			$4th \text{ arc } 8'51''$
Third arc	$27,49$	Prop. L.	0.8110
Fourth arc	$8,57$	From distance once corrected	$51,28,27$
Difference	$18,52$	Subtract second correction	$18,52$
		Distance twice corrected	$51,9,35$
Correction of Moon's app. altitude in table XIV, gives			$0,18$
Second correction of distance in table XIV, gives			$0,3$
Difference to be added			15
Distance twice corrected			$51,9,35$
True distance			$51,9,50$

EXAMPLE 2.

Moon's apparent altitude $5^{\circ}17'$, horizontal parallax $61'48''$, sun's apparent altitude $84^{\circ}7'$, apparent distance $90^{\circ}21'13''$, required, the true distance.

Refraction

Refraction of the Sun 64
Parallax in altitude 1

Correction of the Sun's alt. 5
Sun's apparent altitude 84° 7' 0

Sun's true altitude 84, 6, 55
Corr. of Sun's alt. 0, 5ⁿ P. log. 3.3344 3.3344
Sun's app. alt. 84° 7' cosine 9.0107 cotangent 9.0130
App. distance. 90 21 sine 10.0000 tangent 12.2140
Moon's app. alt. 5 17 cosec. 1.0358
First arc 0' 0ⁿ $\frac{1}{2}$ Prop. L. 3.3809 2d arc 0' 4ⁿ $\frac{1}{2}$ 4.5614
Second arc 0 4 $\frac{1}{2}$ To apparent distance 90, 21, 13
Add first correction 5
Sum - 5

Distance once corrected 90, 21, 18
Corr. of Moon's alt. 52, 4 P. log. 0.5387 0.5387
Moon's app. alt. 5, 17 cosine 9.9982 cotangent 11.0340
Dist. once corrected 90, 21 sine 10.0000 tangent 12.2140
Sun's true altitude 84, 7 cosec. 0.0023
Third arc 52, 1 Prop. L. 0.5392 4th arc 0' 2ⁿ 3.7867
Fourth arc 0, 2 From distance once corrected 90, 21, 18
Subtract second correction 52, 3
Sum - 52, 3

Distance twice corrected 89, 29, 15

The correction from table XIV being nothing, the above is the true distance.

EXAMPLE 3.

Moon's apparent altitude 84° 46', horizontal parallax 61' 18",
Star's apparent altitude 5° 6', apparent distance 89° 58' 6",
required, the true distance.

Star's apparent altitude 5, 6, 0
Refraction - - 9, 44

Star's true altitude 4, 56, 16

Star's refraction 9, 44 P. log. 1.2670 1.2670
Star's app. alt. 5° 6' cosine 9.9983 cotangent 11.0494
App. distance 89 58 sine 10.0000 tangent 13.2653
Moon's app. alt. 84 46 cosec. 0.0018
First arc 9' 44ⁿ Prop. logar. 1.2671 2d arc 0° 0' 5.5817

T.

To apparent distance

89,58,6

Add first correction

9,44

Distance once corrected 90, 7,50

Corr. of Moon's alt. 5' 30" P. log. 1.5149 1.5149

Moon's app. alt. 84 46 cosine 8.9600 cotangent 8.9619

Dist. once corrected 90 8 sine 9.9999 tangent 12.6332

Star's true altitude 4 56 cosec 1.0655

4th arc 0' 8" 3.1100

Third arc 5' 11" Prop. logarithm 1.5403

Fourth arc 8 Distance once corrected 90, 7,50

Subtract second correction 5,19

Sum - 5,19

Dist. twice corrected 90, 2,31

As the correction from table XIV is nothing, the above is the true distance.

EXAMPLE 4.

Moon's apparent altitude $41^{\circ} 6' 2''$, horizontal parallax $58' 35''$, sun's apparent altitude $19^{\circ} 3' 36''$, apparent distance $103^{\circ} 29' 27''$, required, the true distance.

Sun's refraction 2,44

Parallax in altitude 8

Corr. of Sun's altitude 2,36

Sun's app. altitude 19,3,36

Sun's true altitude 19,1,0

Corr. of Sun's alt. $2' 36''$ P. log. 1.8403 1.8403Sun's app. alt. $19^{\circ} 4'$ cosine 9.9755 cotangent 10.4615

App. distance 103 29 sine 9.9878 tangent 10.6202

Moon's app. alt. $41^{\circ} 6'$ cosec. 0.18212d arc 0' $12\frac{1}{2}''$ 2.9220First arc $1' 52\frac{1}{2}''$ Prop. logar. 1.9857Second arc 0' $12\frac{1}{2}''$ Apparent distance 103,29,27

Add first correction 2, 5

Sum - 2 5

Dist. once corrected 103,31,32

Corr. of Moon's alt. $43' 03''$ P. log. 0.6213 0.6213Moon's app. alt. $41^{\circ} 6'$ cosine 9.8771 cotangent 10.0593

Dist. once corrected 103 32 sine 9.9877 tangent 10.6187

Sun's true altitude 19 1 cosec. 0.4869

4th arc 9 2" 1.2993

Third arc $19' 9''$ Prop. logar. 0.9730

Fourth arc 9 2 Distance once corrected 103,31,32

Subtract second correction 28,11

Sum - 28 11

Distance twice corrected 103, 3,21

76

	127
The correction of the Moon's altitude gives, in table XIV	4 ^u
The second correction of the distance gives, in table XIV	2
Subtract difference	—
Distance twice corrected	103,3,21
True distance	103,3,19

F I N I S.



E R R A T A.

TABLE I. Half cosecant of $1^{\circ} 43'$ read 76175.08. Cosecant of $34^{\circ} 4'$ read 0.25169,01. Cosecant of $38^{\circ} 1'$ read 0.21049.64.—Page 21, minutes in the right hand column from 13 to 20 misplaced.

TABLE II. 11° Par. 57,50 Log. read 60.45. 12° Par. 55,50 Log. read 63,90. 13° Par. 56,40 Corr. read 51,10. 14° Par. 53,20 Log. read 71,85. 89° Par. 59,00 Log. read 363,70.

TABLE VI. Against Alt. 1,25, read 21,44. Against Alt. 34° , read 1,24.

TABLE XI. Line 2 from bottom, under *magnitude*, for 5 read 2. Line 20 and 19 from bottom under *An. var. in decl.* read—17,46 and—17,15.

APPLICATION.—Page 100 line 14 for 89,24 read $98^{\circ} 24'$.—Page 101 line 16 for 54,26 read $53^{\circ} 20'$.—Page 102 line 16 read $59^{\circ} 00'$.

2

118,00 Slide B C required.

Page 103 line 14 for 0.03788 read 0.04788.—Page 105 line 3 read taken out of.—Page 108 line 10 read General Rule; line 17 for latitude read colatitude.—Page 109 line 18 from bottom for 98,34,31 read $98^{\circ} 35' 31''$.—Page 110 line 13 from bottom delete zenith distance against 107,41,33 and read it against 54,3,07; line 9 from bottom for Sun's read Star's; line 8 from bottom read h. m. s. over 18,29,41.—Page 112 line 15 read logarithm; lines 17 18 and 26 read arc; line 8 from bottom read correction.—Reserved logarithm 67.—Page 121 line 5 read $6^{\circ} 45' 36''$; line 12 for secant read cosecant.

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